

AUTOMOTIVE INDUSTRIES

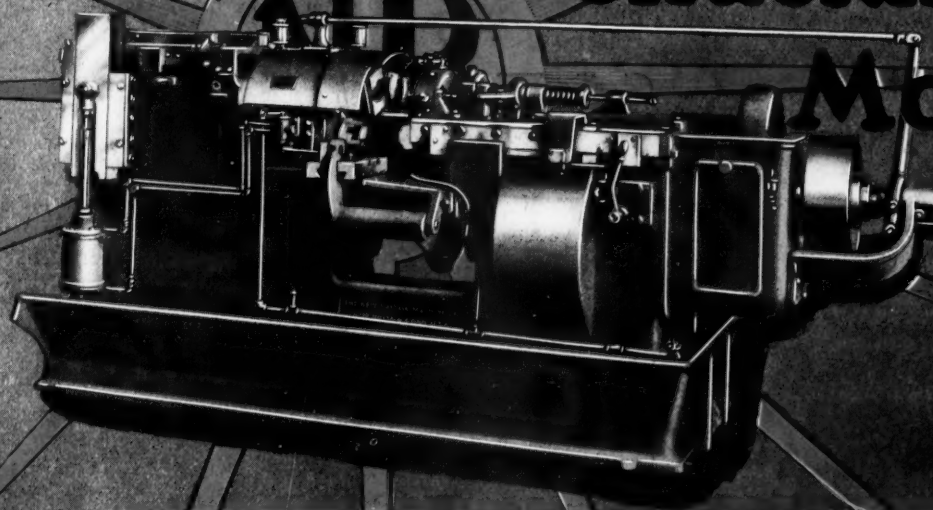
Volume 55
Number 18

PUBLISHED WEEKLY AT CHESTNUT AND 56TH STREETS
PHILADELPHIA, OCTOBER 28, 1926

35c a copy
\$3.00 a year

NEW BRITAIN New-Matic Chucking Machine

(Work Rotating Type)



Judge This Machine on Results!

Experts do not buy chucking machines on price---but on results. Experts all over the country are using the New Britain New-Matic Chucking Machine for results which have never been obtained before. The results are lower production costs, high quality and real economy. New Britain Automatics are designed and built by men of long practical experience. This experience is at your command.

The New Britain Machine Company

New Britain

Connecticut

Waukesha Engined Fageot Truck Handles 14-Ton Hay Load.



**With
Almost
Passenger
Car Mileage**

G. L. Weaver of El Monte, Calif., who owns four Fageols equipped with Waukesha "Ricardo Head" Engines, tells us, that over an 80 mile run in hilly country, thru heavy traffic, this truck and trailer are averaging nearly 14 miles an hour, making 8 miles per gallon of gasoline and using a quart of oil in 400 miles. Just another proof of Waukesha "Ricardo Head" power and economy.

But the user can tell you, long life and freedom from detonation or "ping" are equally as important characteristics of all Waukesha "Ricardo Head" Engines. For Bus and Truck Service Waukesha Engines may be obtained in four and six cylinder types and from 20 to 120 horsepower in size. Write for "Ricardo Head Principles," telling why Waukesha Engines are so economical and powerful.

AUTOMOTIVE EQUIPMENT DIVISION

WAUKESHA MOTOR COMPANY
Waukesha Wisconsin

Eastern Sales Offices

Aeolian Building, 33 W. 42nd Street

New York City

AUTOMOTIVE INDUSTRIES

VOLUME 55

Philadelphia, Thursday, October 28, 1926

NUMBER 18

Olympia Show Opening Marked by British Price Cuts

Reductions average about 8 per cent although much heavier slashes are made in some cases. Morris announces a larger "four". 20 American makes exhibited.

By M. W. Bourdon

LONDON, October 23—(Special cable to *Automotive Industries*).—An unusually large proportion of six cylinder cars among new British models, extensive adoption of metal reinforcements in body work, widespread provision of vacuum servo brake mechanism and improvement in sedan outlines are among the design features in evidence at the twentieth Olympia Automobile Show which opened here on Friday, October 22.

More new models of all nationalities are being shown than ever before. There has been a general reduction in prices, averaging about 8 per cent, on British and also on many foreign models, although a slight increase is recorded by some French makers. While the average cut has been about 8 per cent, very heavy slashes have been made in some cases. Morris has cut the price of one model 25 per cent, while a Minerva reduction is 23 per cent. Several other makers announce reductions ranging from 15 to 20 per cent. Reductions vary widely on different models of the same make, the largest cuts being applied to sedans in most instances.

Thirty-three new British models are being shown. In this group are one twelve-cylinder model, one "eight", nineteen "sixes," ten "fours," and two "twos".

All Sixes Under 220 Cu. In.

The general character of the new sixes is indicated by the piston displacement of the various models. Ten of these new sixes have a piston displacement of less than 150 cu. in., sixteen are under 200 cu. in., while all nineteen have a displacement of less than 220 cu. in. Of the four-cylinder models, three have a displacement of less than 67 cu. in., and five of less than 100 cu. in., while all ten of this group are under 150 cu. in.

This year nine six-cylinder models are selling for less than £500, as against two last year. Twenty-four of the British models this year have overhead valves; six of this group have overhead camshafts. Of the other new models, five have side valves, three sleeve valves and one is valveless.

Despite the large proportion of small sixes among the new cars this year, there exists a widely expressed scepticism as to whether the demand will justify so many models in a field hitherto unexplored except by Singer with its 108 cu. in. six, which was introduced last year. Many makers, including Morris, believe that British buyers of small "economy" cars still will favor four-cylinder models. This opinion is based on the fact that the most popular type at present is a four-cylinder car of about 100 cu. in. displacement priced under £250 for phaeton or sedan.

Cheapest Small Six Phaeton £325

The cheapest phaeton among the small sixes is priced at £325, while the lowest-priced sedan is £350.

Front wheel brakes now are standard on 90 per cent of the British cars. About 10 per cent have a vacuum servo. In this group are included three low-priced models. Four makers are using Lockheed hydraulic brakes; no additional companies have adopted the mechanical servo type. Vauxhall is using a hydraulic brake of its own design on its big four and single-sleeve six models.

Brakes show no fundamental design changes but general improvement has been brought about by stiffening cross shafts, frames, and front springs. A majority of four-wheel brakes have no compensation.

Austin—alone among British makers—now is using all-metal body work. Others, however, are using steel reinforcements extensively. This has resulted in the introduction of "touring saloons" having a phaeton body foundation with sedan top. One maker, Standard, offers a touring saloon with a sliding half-roof optional.

Marked improvement is noticeable in the appearance of low-priced sedans. Curved lines are displacing the more rigid rectangular shapes in many instances. Improvements in phaeton lines have been even more marked. Side screens on the Humber and the Standard lower into the doors, while on Austin the side screens are hinged.

There has been a widespread adoption of nitro-

cellulose finish, although Morris is a notable exception to this trend.

Pleated upholstery seems to be displacing plain cushions, while leather is being used more widely than cloth for sedans.

Two makers, one of whom is Lanchester, now offer chromium plating.

Many Fabric Sedans

Most makers are showing a fabric sedan. In a large number of instances this model varies widely from the Weymann conception and usually has rigid framing with aluminum panels below the waistline. An ordinary type sedan usually is available in addition to the fabric model, but the fabric type usually is lower in price.

The difference in price between closed and open models of British cars is narrowing very considerably. Sedan prices still exceed phaeton prices in every case, but the difference is smaller than ever before, owing to the continued increase in output of closed cars.

Morris sprang a surprise at the show by adding a larger four-cylinder model, powered with a side valve engine of 150 cu. in. displacement. This new Morris model has four speeds, overhead worm drive, 114-in. wheelbase and 56-in. tread. The five-passenger model sells for £325, and the chassis for £245.

Austin has a new 200 cu. in. six, offered only in a Landalet model at £775. A fabric sedan is now being offered on the 45 cu. in. four-cylinder model.

Daimler is showing two examples of its new twelve-cylinder model. The powerplant in this car is a sixty degree V type having Knight valves and a piston displacement of 435 cu. in. The limousine model sells for £2700, and all models are now equipped with vacuum servo brakes. A detailed description of this car appears as a separate article elsewhere in this issue.

Singer has a new four-cylinder overhead camshaft model of 52 cu. in. displacement. The four-passenger model sells for £148.

Rolls-Royce and Lanchester designs and prices both remain unchanged this year.

Sunbeam has three new sixes, one with an engine of 125 cu. in. displacement and another of 176 cu. in.

displacement. Prices have been reduced greatly. Sunbeam is also showing a larger 332 cu. in. eight.

Talbot has introduced a new light six, the piston displacement of which is 102 cu. in. The wheelbase is 120 in. The phaeton model of this new Talbot, which sells for £395, is much lower in price than were the two models which it supersedes.

Wolseley has a new 122 cu. in. six-cylinder overhead camshaft car, the phaeton model of which sells for £450.

One additional maker, Aster, has a single sleeve valve six which has distinctive operation in that skew gears are eliminated. This is a high-priced car.

Three British makers, two of which are showing at Olympia, are offering light cars for £100. One of these is a valveless two-stroke twin-cylinder job with a roomy phaeton body; another is an overhead valve 61 cu. in. four; while the third is a two-cylinder flat twin type.

Attendance on the opening day of the show this year was 21,845, a gain of more than 5000 over the opening day last year, when 16,400 admissions were recorded. More overseas dealers are attending the show this year than ever before. Export business in general, and in India, Australia, New Zealand and South Africa in particular, shows promise of further improvement.

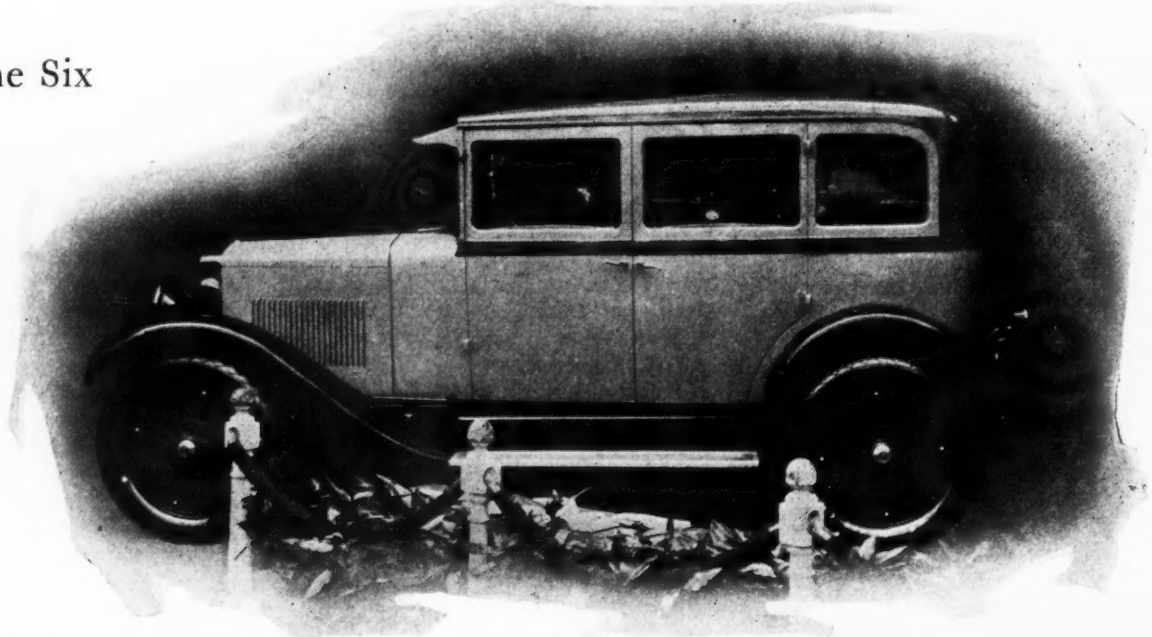
Several British light car makers are offering special export models with a 56-in tread, stronger frames and springs, and roomier bodies. Morris states that its new 150 cu. in. four-cylinder model has been designed primarily for export sales. Morris reports that orders received for all models during the six weeks since the 1927 program was announced are nearly 300 per cent above last year. Although the output of the Morris factory has been restricted by material shortage due to the coal strike, production is now going ahead at the rate of 1100 a week.

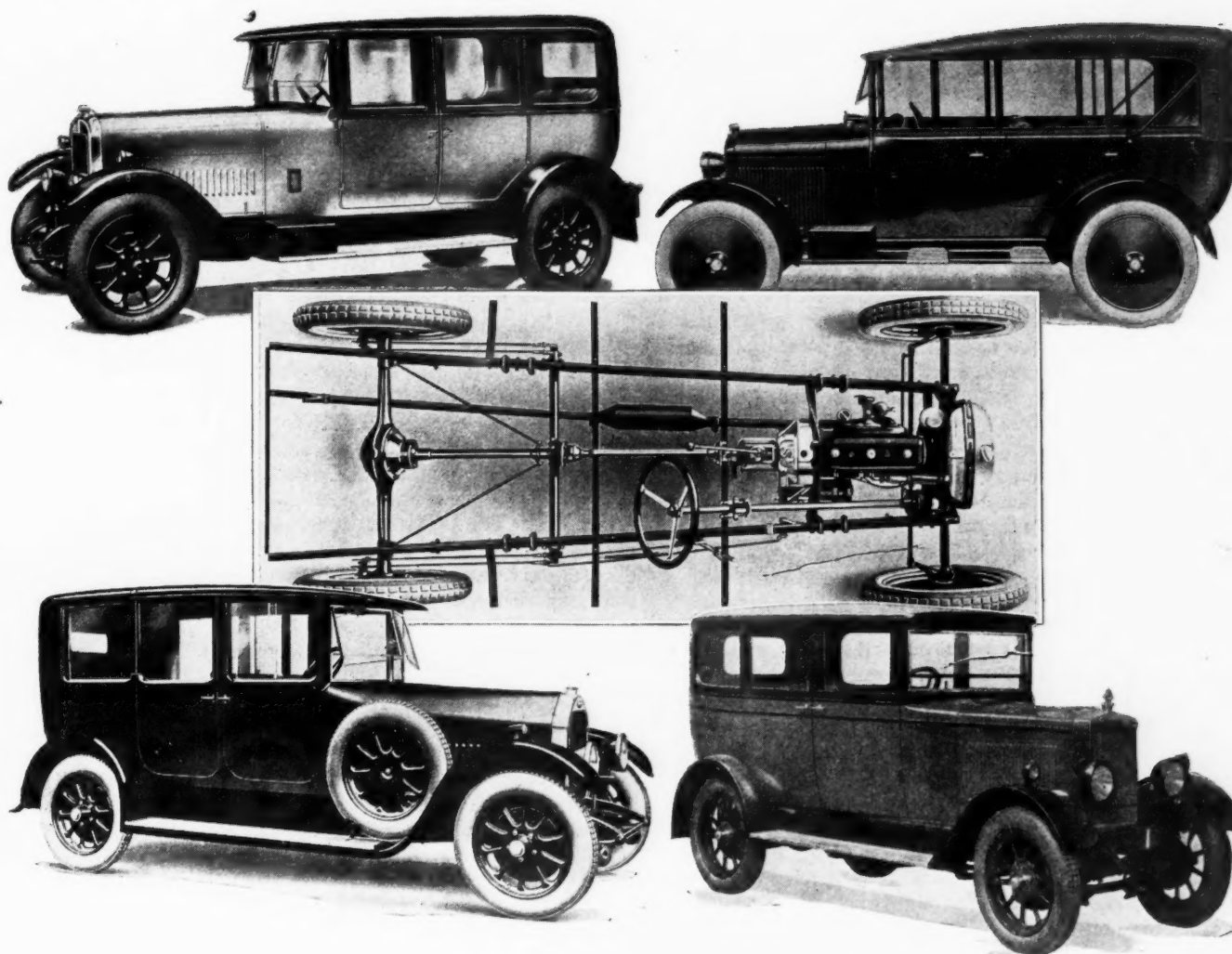
Strike Hurts Business

British makers generally are anticipating an increase in domestic demand for automobiles when the coal strike is settled. The strike has strangled trade, making outputs generally lower than in 1925.

The Erskine Six

Studebaker's new European-type light car which was unveiled at the Paris Salon and later exhibited at Olympia. This model, the sedan, lists at \$975, f.o.b. Detroit. The car was described in our issue of Oct. 7.





UPPER LEFT: Five-seated sedan on new Bean Six chassis. Engine has piston displacement of 2.7 litres. Price is £595. UPPER RIGHT: New 8 hp. (850 c.c.) Singer Junior, which, with a four-cylinder overhead camshaft engine and the four-passenger body shown, is offered at £148. Has rear brakes only. CENTER: Chassis of new Singer 8 hp. Four with overhead camshaft. LOWER LEFT: New 20-55 hp. Humber Six with enclosed landaulet body priced at £940. LOWER RIGHT: Morris-Oxford 14 hp. sedan with new radiator and four-door body. Price reduced from £350 to £265

There are a total of 101 exhibitors at the Olympia Show this year, 20 less makes than in 1925. The distribution of exhibitors by nationalities is as follows: British, 43; French, 25; American, 20; Italian 9; Belgian, 2; Austrian 2. Germany still is barred from the show, probably for the last time.

At the show this year there are altogether 532 stands. The exhibits include 98 by car manufacturers, 63 by custom body builders, 331 by accessory concerns, 21 by tire companies and 18 miscellaneous. Complete cars to the number of 552 are shown, while the chassis exhibited number 69. Following are the American makes exhibited: Buick, Cadillac, Chandler, Chevrolet, Chrysler, Dodge, Essex, Hudson, Hupmobile, Marmon, Moon, Oakland, Oldsmobile, Overland, Packard, Paige, Reo, Studebaker, Stutz, Willys-Knight.

Studebaker is showing the new Erskine Six. An exhibition of Ford products, accessories, and special body work is being held this week in a large hall near Olympia.

MORRIS was expected to come out with a new six, but introduced the larger four-cylinder model instead. The line now consists of three "fours" of 94

cu. in., 110 cu. in. and 150 cu. in. piston displacement, respectively. Concerning the latter job, very little information is available as yet. Numerous alterations have been made in chassis details of the two smaller cars, and the entire body line has been redesigned to accord with a new flat-fronted radiator with rectangular outline that has taken the place of the V-fronted type.

Austin has not made any pronounced changes in its three four-cylinder models, but all prices have been reduced, a new "Six" has been introduced and a steel frame construction has been standardized for all bodies.

The new six-cylinder Austin has $3\frac{1}{8}$ by $4\frac{1}{2}$ in. cylinders (207 cu. in.). Side valves are used with a detachable head and a cylinder block separate from the barrel-type aluminum crankcase. The crankshaft has eight bearings and carries the driving sprocket for the chain distribution gear at its rear end, between the seventh and eighth bearings. The timing chain passes round a third sprocket, driving the generator, water pump and magneto in line and its tension is maintained by a flat spring leaf bearing against the idle length. Each main bearing cap is held by two long bolts which pass up through the top of the crankcase, these having integral collars with extensions forming studs that pass through the cylinder block flange. Rol-

ler-ended cam followers are used and aluminum pistons.

Inlet and exhaust manifolds are separate, the latter having its downtake at the front end and five branches, the central one serving two cylinders. The inlet manifold, an aluminum casting formed in two sections for a duplex Zenith carburetor, has a hot-spot formed by an L-shaped aluminum plate bolted to it and to the exhaust manifold. The induction unit has right-angle bends from the dual stems, the horizontal members, of round section, being continued beyond the end branches to the cylinder ports. There is nothing unorthodox in the remainder of the chassis, which has a wheelbase of 136 in. For the time being the chassis is offered with enclosed landaulet or limousine bodies only, the price being £775.

One of the most notable of new British cars is the new 14-45 hp. six-cylinder Talbot. It has a bore and stroke of 61 x 95 m. m. (100 cu. in.). The cylinder block is a unit casting with the upper half of the crankcase, but the aluminum lower half extends both in front of and behind the cylinder block, in front as the bottom of the front-end casing and behind to form an open half-depth pit for the flywheel.

Talbot Engine Support

Engine support is by a pressed steel "bridge" bolted to the back of the cylinder block and having a curvature that causes it to form a short tunnel for the flywheel; the latter, having vanes on its periphery, serves in place of a radiator fan. The radiator rests on two short arms extending forward from the cylinder block, one of these forming the water passage to the lower tank. This scheme eliminates the usual lower return pipe and frees the radiator from the effects of frame distortion. Water circulation is by thermo-siphon, and a relatively high and narrow cellular radiator is used.

A dynamotor is used for lighting and starting, the single unit being coupled to the front end of the crankshaft. The front of the armature shaft is extended for a detachable starting crank. There are only two gear wheels in the front-end casing, the one on the camshaft being non-metallic. Provision is made, however, for driving a magneto by means of a third pinion engaging with the camshaft wheel.

The induction manifold carries a Smith multi-jet carburetor at the front end and is cast as a unit with the horizontally finned exhaust branch. Lubrication is by pressure throughout. The crankshaft has four bearings and disk webs.

The single dry-plate clutch is used and can be dismantled without disturbing the gearset, though the latter is easily removable. Extending from the rear end of the gearset is a unit casting that forms the housing of the metallic joint of the propeller shaft, a bracket for the cross-shaft of the four-wheel brakes and a central bracket for the hand lever shaft, which, at its outer end, is supported by a bracket on the frame. The propeller shaft is enclosed in a torque tube and has a ball steady bearing near its center.

One of the most popular lines of British light cars, the Singer, has been supplemented by a new model of 8 hp. Prices on the two earlier models, a 10 hp. four and a 14 hp. six, have been reduced from £350 to £325 and from £375 to £350 for the open models, respectively. The new 8 hp. has a four-cylinder overhead camshaft engine of only 52 cu. in. (the other models have push-rods), its bore and stroke being 56 x 86 mm. (2.2 x 3.39 in.). The overhead camshaft is an unusual feature in British light car practice and the new Singer is actually the smallest engine thus equipped. Its drive from the crankshaft is by helical gears to a layshaft, and thence

by a silent chain to the camshaft above, automatic tensioning being secured by a long spring blade that presses against the outer side of the chain on its idle length. In front of the helical gear on the layshaft is a bevel gear driving, through two pinions, the dynamotor on one side and the magneto on the other, these units inclining upward at an angle of 45 deg. Extending from the front end of the layshaft is a jaw coupling for the oil pump. The overhead valves are inclined outward on each side of the camshaft and are actuated by bell-crank rockers.

Pressure lubrication is carried up to the overhead valve gear. Crankcase lubrication is by pressure to the two main bearings and by troughs under the connecting rods. The cylinder block and crankcase are an integral unit in cast-iron with a pressed steel plate forming the underpan.

The unit powerplant is supported at the front on a tubular cross member, and at the rear by a pressed steel bearer plate bolted between the crankcase and the bell housing. Diagonal stays are used to brace the torque tube and the pressed steel rear axle housing. The spiral bevel drive has a ratio of 5 to 1, the tires being 26 in., on disk wheels. The wheelbase is 96 in. and the track 46 in. With a four-seated body, including an excellent equipment of metal framed side screens for the folding top, the price is £148.

The following dimensions are of interest: Clear width across front seat, 35 in.; back seats, 37 in.; from the pedals to the back of front seat, 38½ in.; or, when the adjustable seat is moved back 41 in., from back of front seat to backrest of rear seat 39 in. The front seats are separately adjustable, but none of the upholstery, cushions or backs, is sprung.

This miniature car cuts into the field hitherto occupied almost exclusively by the 7 hp. Austin, the output of which is about 200 per week. The Singer weighs approximately 1200 lb.; its indirect ratios are 16.5 and 8.5, and its engine is stated to develop 16.5 b. hp. at 3250 r.p.m., 12.4 b. hp. at 2000 r.p.m. and 6.2 b. hp. at 1000 r.p.m.

Three Vauxhall Models

Vauxhall cars (controlled by General Motors) will be confined to three models for 1927, viz., two fours and a six. The latter is the single sleeve model that was introduced last year but went into production only a few months ago and has not been changed appreciably for next year. Prices remain the same, the chassis being £1050, the seven-passenger phaeton, £1400, and the sedan, £1625. The 30-98 hp. four-cylinder speed model is now also fitted with the hydraulic four-wheel brakes introduced on the six, as well as with the four-speed gearset of the six to assist further in securing standardization. This model is now guaranteed to do 80-85 m.p.h. with a fully equipped four-passenger touring body and 100 m.p.h. with a single-seated racing body. The chassis price is £950.

The Vauxhall plant will, however, concentrate very largely upon the production of the other 140 cu. in. four, with L-head engine, four speeds, four-wheel brakes, wire wheels, 117 in. wheelbase, 57 in. track and 31 x 5.25 in. tires. Prices have been considerably reduced, the open model now being £495 instead of £550, and the sedan, listing at £595.

Three new models are introduced by the Sunbeam Motor Co.; all have six cylinders and are rated at 16 hp., 20 hp. and 25 hp. The latter is an additional model with a bore and stroke of 80 x 110 mm. (3.3 litres); the valves are pushrod operated, with exhausts of larger

diameter than the inlets. A point of note in connection with the lubricating of the rocker bearings is that, while the exhaust rockers are supplied with oil under pressure from the hollow rocker shaft, the inlet rocker bearings depend upon the mist of oil within the aluminum top cover, the idea being to avoid the possibility of an excessive quantity of oil passing to the inlet valve guides. The design in general follows that of the 20 hp. model described in *Automotive Industries* of Oct. 14.

Eight-Cylinder Sunbeams

The continued chassis of the Sunbeam range include two eight-cylinder models bearing close resemblance, one known as the 30 hp. (4850 c.c.) and the other 35 hp. (5447 c.c.), the last mentioned having a longer wheelbase and a divided propeller shaft.

The new 16 hp. six displaces a 14 hp. four, and although of approximately the same capacity its price is less; the five-passenger open car is £550 whereas the four with a similar body was £625. The six cylinders have a piston displacement of just over two litres (approximately 122 cu. in.), the bore and stroke being 67.5 x 95 mm.

Rover cars are being made in three models, all with four-cylinder engines, though a new Six is said to be on the stocks. One of the fours, a 16-50 hp., has an engine and chassis closely following the lines of the overhead camshaft 14-45 hp. Rover which was described in detail in *Automotive Industries* of November 20, 1924, the cylinder dimensions of the new model being 80 x 129 mm. as compared with 75 x 120 mm. The other four is one of the most popular of really small British light cars; it has a piston displacement of only 65 cu. in. and yet carries bodies of ample capacity and leg-room for four adults. It has four-wheel brakes and sells at £225 for the open model. Prices of the 16-50 hp. four are: Five-passenger, £575; Weymann sedan, £675; normal sedan, £775; while the corresponding complete cars of the 14-45 hp. model are £485, £585 and £685.

A new six-cylinder 18-50 hp. model with a stock (Meadows) engine modified in certain respects, and a "Short Fourteen", are additions to the program of the Bean Motor Company. It is interesting to note that H. Kerr Thomas, formerly with Pierce-Arrow and latterly with the Associated Equipment Co., is now managing director of this company. He was appointed to his new position when a controlling interest in the Bean company was secured, early this year, by Hadfields, the Sheffield steel firm.

The new Bean "Six" is a sturdy job which will be pushed in overseas markets as well as England. It has 69 by 120 mm. cylinders (2692 c. c.), pushrod operated valves, silent chain, camshaft and accessories drive, the cylinder block separate from the aluminum crankcase, pressure lubrication to all crankshaft bearings and overhead valve gear, Autovac fuel feed, and a water jacketed induction branch. The water connection from cylinder jackets to head is made by exterior connections. The engine, which has a four-bearing crankshaft is stated to develop 50 b.hp. at 3000 r. p. m.

The unit powerplant encloses a dry single-plate clutch and a four-

speed gearset in a bell-housing bolted to the crankcase with right-hand (outside) control for gears and hand brake. Clutch and brake pedals are adjustable. The four-wheel braking system has equalization only between the rear wheels. Separate shoes in the rear drums are provided for hand lever actuation. The front brakes are of the Perrot self-energizing type with two shoes.

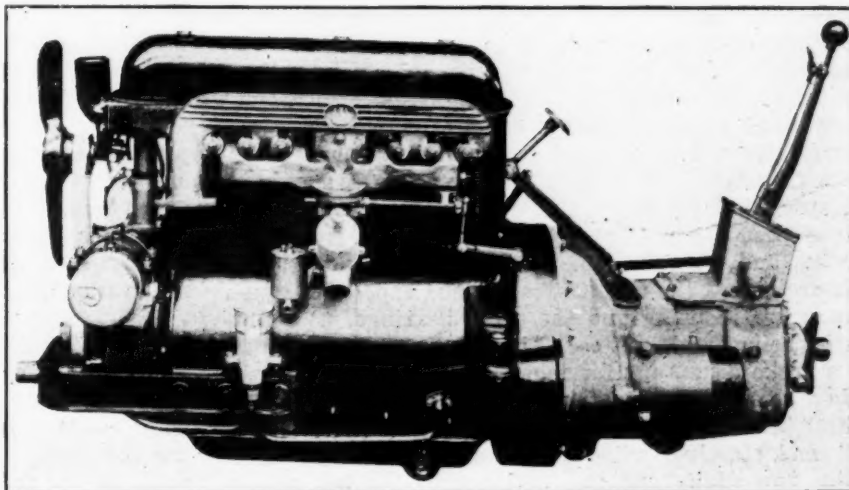
The following general particulars are of note: Chassis weight, 2250 lb.; wheelbase, 122 in.; track, 56 in.; gear ratios: 4.7, 7.75, 11.37, 18.8 and 24.15 reverse. The weight of the open car, with all-weather top and side screens and a folding rear screen that shuts up into a recess at the back of the front seat, is 2900 lb. and that of the four-door sedan, 3050 lb.; the prices of these two models are £475 and £595 respectively, while the chassis price in London is £365. A choice of five colors in lacquer finish is offered.

The new "Short Fourteen" has a four-cylinder L-head engine of 2.4 liters in a chassis designed for the "Twelve" (1.8 liter) but with a 6 in. longer wheelbase. The smaller model is continued, though its price is only £20 less than the other; with a four-passenger body the last mentioned is £275 (four-door sedan £350) while with the larger engine the price is £295 (Sedan £365).

As innovation in British practice, the "Long Fourteen" is being offered with closed bodies only, the four-door sedan being £440 and the landaulet £575.

Two new models, a four and a six, the four displacing a somewhat smaller type and the six being supplementary, are being shown by Humber. The 171 cu. in. four and the 64 cu. in. four are being continued unchanged in design. The smallest model represents a type of light car that is proving very popular in England; it has been supplied usually with a four-passenger body extremely well finished, at £260, though a fair proportion of three-door sedans have been sold at £315.

Like the other Humber models, the new six has overhead inlets and side exhaust valves, with the spark plugs on the side of the cylinders removed from the exhaust valves. The bore and stroke are 75 x 116 mm., giving it a piston displacement of 187 cu. in. The crankshaft has seven bearings and the camshaft five, the latter shaft being driven by Fabril gear from the steel crankshaft pinion. There is also a gear drive for the generator on the left, but for the magneto an



The new Wolseley six-cylinder two liter engine which was described in detail in the Oct. 14 issue

adjustable silent chain is used. Twin carburetors are provided. A duplex gear type pump delivers oil under pressure from the larger section to the crankshaft and camshaft bearings, the overhead valve gear and the front-end gears, and from the smaller section to troughs under the connecting rods (combination splash and force feed system). Aluminum pistons are used, with a split skirt connected to the piston head only by bosses that also support the floating wrist pin. The mushroom-ended cam followers for the exhausts have phosphor-bronze lower faces.

Heat Indicator on Dash

Water circulation, primarily by thermo-siphonic action, is assisted by an impeller at the rear end of the fan shaft; an expanding type of pulley is used for the V belt. A thermostatic valve is fitted in the header pipe and provision is made in the cylinder head for a distant-reading thermometer with a dial on the instrument board. The starter drive has a 2 to 1 reduction gear between the motor shaft and the pinion that engages with the flywheel gear.

Chassis details are practically identical with those of the larger four. The pedal-actuated Perrot front brakes are linked to a band brake back of the gearset, the shoes in the rear drums being hand-operated.

Clyno cars, which have an output second only to Morris, and which compete with the latter more directly than any other British make, are being offered unchanged in the home market, apart from price reductions. But for the export field the 12 hp. model (the larger of two) is to be produced with a 56 in. track in place of 48 in. and will have a frame of heavier gage, a fan for the radiator and a roomier body. This model has a four-cylinder 91.5 cu. in. engine, a wheelbase of 105 in. and 28 x 4.95 tires on hollow steel wheels. With a four-passenger body its price in England is £220 (hitherto £260) while the price of the four-door sedan has been reduced from £298 to £250. The slightly smaller (83 cu. in.) model is identical in design and is sold as a four-passenger with four-wheel brakes at £172 (last year £190) or as a four-door sedan at £230 (old price £245).

The Wolseley exhibit is notable in regard to the new two liter "Six" (described in *Automotive Industries* of Oct. 14). The remaining items of the Wolseley program consist of the 11-22 hp. overhead camshaft model (1261 c. c., four cylinders), the 16-35 hp. four (2614 c. c.) and the 24-55 hp. six (3921 c. c.), all of these being continued models.

The first British four-cylinder car to be offered at £100 makes its appearance at Olympia; it is known as the 8 hp. Gillett, and, strangely enough, is introduced by the makers of the British Ensign Six, a model put forward in 1919 and 1920 to compete with Rolls-Royce, Lanchester and other supergrade cars, but subsequently withdrawn. The Gillett has a piston displacement of approximately 60 cu. in., pushrod operated valves, three-speed gearset, spiral bevel final drive, four-wheel brakes and 26 x 3½ in. tires. The only unorthodox feature is that the tubular rear axle is exposed between the central housing and the outer bearings, no differential being used. At each side of the central housing is a brake drum, one for hand operation alone and the other for pedal actuation in conjunction with front wheel brakes. The equipment includes electric lighting and starting, while the standard body accommodates two adults and two children behind but within the shell and enclosed by the folding top.

The Rhode, a well-known British light car, has been

redesigned throughout, and embodies a novel system of frame construction. The side rails have the channels facing outward; apart from the bearer arms of the powerplant there are only three cross members, two being 1¼ in. tubes and the third a substantial channel section unit near the center of the frame. This main cross member is curved to a considerable depth below the propeller shaft and its lowest point forms the anchorage of four tie-rods that run diagonally fore and aft to the ends of the tubular cross members near the ends of the frame. This diagonal trussing renders the frame exceptionally rigid, allowing of the use of a light body.

The superseded engine had an overhead camshaft, but the new one (75 cu. in.) has pushrod operated valves. The lubrication system is unorthodox; the flywheel picks up oil and flings it into a conduit leading to a camshaft tunnel. Archimedean screws are cut out in the camshaft journal and these force the oil to the main bearings and to the overhead valve gear. Duralumin connecting rods are used. The four-wheel brakes are completely equalized and a hand wheel adjustment for them extends through the floorboards; another similarly accessible hand wheel is provided for the hand brake. Pneumatic upholstery is fitted.

One of the few relatively large and costly new cars is the single sleeve valve six-cylinder 80 by 115 mm. Aster, which supplements an overhead valve three-liter six. The chassis price is £785. The sleeve valves are of the Burt-McCullum type but are of steel and are actuated in a new manner. There are no helical gears or transverse layshifts as used hitherto in Burt-McCullum valve gear. Chain drive is used for the half-speed shaft. Other items of the specification are: Aluminum pistons, pump circulation, pressure lubrication throughout, dual ignition, double dry-plate clutch unit power-plant, four-speeds with right-hand control, enclosed propeller shaft, 4.2 to 1, spiral bevel drive cantilever rear springs, Perrot front brakes, mechanical servo brake, adjustments accessible and usable while driving, and "one-shot" chassis lubrication, the Aster being the first British car to have the latter.

A Brand New Car

A name hitherto unknown in the British motor industry is that of the new two-liter Brocklebank "Six". Although but a small output is planned for 1927 (500 cars), an up-to-date plant with moving track assembly has been put down with a view to rapid expansion. For the time being only sedan bodies will be offered, the price being £395. The engine, with pushrod operated valves, has a bore and stroke of 2.5 x 4.25 in.; cylinder block and crankcase are unit-cast, with a pressed steel underpan, the crankshaft has 2 in. journals and pins, and four bearings.

Unit construction is adopted for the engine, single-plate clutch and three-speed gearset. A hand brake acts on the transmission and Lockheed expanding four-wheel brakes are fitted to the frame wheels. The Hotchkiss drive, banjo type rear axle, half-elliptic springs, disk wheels with 31 x 5.25 Dunlop tires present no unusual features.

DURING the first six months of the current year France exported 27,396 quintals (of 220 lb.) of airplanes, valued at 118,078,000 francs, as compared with 14,686 quintals valued at 67,164,000 francs during the corresponding period last year. Placing the value of the franc at 3 cents, the French aircraft exports during the first half of the year amounted to \$3,354,000.

Just Among Ourselves

Big Bus Orders Which Didn't Materialize

ONCE upon a time there was a railroad, so an Ancient Seer wrote us not so long ago, which wanted to round up control of all the profitable bus lines in its territory. At first many of the bus manufacturers were inclined to fight the desires of the railroad and to support the independent operators who already were their established customers. Finally, however, each of the bus makers got the idea from somewhere that he would get the entire order for new buses which would be placed in case the railroad got the franchises. So each maker, thinking that he was sitting pretty, didn't mix into the argument between the railroad and the independent operators at all. Finally the railroad got rid of the independents. Then each bus maker who thought he was going to get a whole big order for himself was presented with his small share of the total order, the business being spread about somewhat equally among a number of companies. All of which proves, according to the Ancient Seer, that it's hard to tell how far a frog will jump from where it sits. After all, maybe the whole thing is just a fable. Who knows?

* * *

Wherein We've Got to Admit an Error

A FEW weeks ago we said that some of our recent figuring indicated that dealer stocks of new cars on July 1 were nearly 200,000 greater than they had been on January 1 of this year. That brought us a pleasant but firm statement from one of our most cherished economist friends in the industry to the effect that, in his opinion, our estimates were all wet; that

they were in fact very wet. Stocks were slightly lower, instead of being very much higher, on July 1 than on January 1, he said, so far as N.A.C.C. members were concerned. "How do you get your results?", he asked. Having done our figuring over again, we beg leave to state that we don't get those results and that our previous dope was all wrong. While our comparison of total sales and production figures for the first six months don't indicate an actual decrease in stocks over that period, they do indicate a very slight increase—if any. And we take this two-fold opportunity to express sincere regret for the error—a kind which we don't often make, fortunately—and to thank our correspondent publicly for taking us to task.

* * *

Plenty of Room for Improvement Yet

HARRY HARTZ, for a number of years one of the most consistent performers among automobile race drivers, has won the Three A championship this year for the first time. Even though he should fail to place in the two remaining events and Lockhart, his closest rival, should place first in both, Hartz still would win the championship by 59 points. A recent statement by the A.A.A. Contest Board makes the following interesting comment on the racing for this year's championship: "The race program just run demonstrated that the problems due to the advent of the 91½ cu. in. engine have been mastered. Speed has been rising gradually since the first race at Indianapolis on May 31. Hartz qualified at Salem with 136.3 m.p.h. In a few more months, it may be expected that the 91½ cu. in. jobs will approach the speed of the 122 cu. in. cars."

All of which calls to mind the fact that considerable possibilities for improvement in automobile efficiency still seem to exist despite the vast strides which already have been made. Thirty years ago, a well-known engineer told us recently, the average automobile engine weighed something like 75 lb. per horsepower; today it is somewhere around 10 lb. per horsepower—and progress still is going forward.

* * *

A "No" in Time Saves Disappointment

THE president of an automobile company has to be a many-sided man. Not only is he called upon to have the technical, sales and managerial knowledge necessary to run a big business, but he also must function more or less as a public speaker and general contact man throughout the industry and the country. These outside requirements often make heavy demands on the time of executives; sometimes demands which are heavier than any working executive really can be expected to fulfill. As a result of this condition, a somewhat unfortunate situation arises now and then, namely, the making of speaking engagements which it turns out to be impossible to meet. It frequently seems easier to say "Yes" than to say "No" when requested to speak before some dealer gathering at a future date, but it would be fairer all around if the request were refused in the beginning instead of being defaulted at the last minute. The ability to say "No" always has been recognized as a necessary asset in an important executive, and, as regards speaking engagements, it seems as though the time at which the "No" is to be said—if it must be said sometime—is worth serious attention.—N. G. S.

Hydraulic Force Used for Operation of New Brake Servo Device

Design permits fine control of braking force by operator.
"Cuts in" to supplement physical effort after pedal pressure has reached a certain point.

A SERVO device of the hydraulic type for the application of motor vehicle brakes, of such design as to permit of fine control of the force of brake application by the operator, has been developed by E. G. Staude, St. Paul, Minn. The servo does not furnish all of the pressure applied to the brakes, but multiplies any excess of pedal pressure beyond that required to overcome the force of the spring holding the valve of the servo off its seat, in a certain ratio, so that the driver can at all times gage the force of brake application by the pressure he is exerting.

Mr. Staude states that he occupied himself with the problem of brake servos as early as 1911. He tried various principles but finally decided upon the so-called hydraulic principle, which consists in creating pressure in oil by means of a gear-type of pump permanently driven by the car mechanism. The earlier applications of this principle naturally were somewhat crude, and the mechanism was quite heavy (25 lb.), besides which, it appears, the driver had no definite control over the pressure of application.

These deficiencies have been overcome in the new design, of which a sectional view is shown in Fig. 1. The device consists essentially of a gear pump and a pressure cylinder with piston and valve, the whole being combined in a single unit which is bolted to the side of the transmission housing. Referring to the illustration, the gear pump containing the pinions 12, draws oil from the crankcase through the port 11 and forces it into the space 13 at the bottom of the servo housing. Immediately above this space forms a cylinder in which is located the movable valve seat 5, which is thimble-shaped and has a flaring edge at its open end, the flaring edge forming the actual seat for the valve 3.

The valve seat 5 is rigidly fastened to rod 9 by means of a nut, the rod being concentric with valve 3. Both the rod and the hollow stem of valve 3 pass through a cap plate for the housing, and suitable packings are provided to prevent oil leakage at this point. The upper end of rod 9 is forked, and the short arm 1 of the brake pedal enters between its two prongs and is

adapted to press against a roller carried by the fork.

The hollow valve stem has a washer secured to its outer end, which washer is provided with a pair of raised lugs that bear against the end of a forked arm 8 of bell-crank 7, to the other, upwardly extending arm of which the brake rod is connected. A spring 6 is located in the thimble-shaped valve seat 5 to normally keep the valve 3 off seat 4; in other words, to normally keep the valve open. The oil set in motion by the pump then enters the valve thimble through holes formed in its bottom, passes through the open valve and returns through a port in the housing to the transmission case. All passages are sufficiently large so that no appreciable pressure can be built up even at high engine speeds.

If now the driver presses on the brake pedal, he raises the valve sleeve 5, thereby partly closing the valve. Immediately a pressure is built up in the oil between the pump and the valve seat, which pressure acts on valve 3, raising it, and thereby applying the brakes. At no time will the valve be completely closed—unless the brakes should be disconnected or entirely mis-adjusted—the degree of opening (or closing) being proportional to the pressure applied to the pedal and the pressure exerted by the brakes on the one hand and to the speed of the car on the other.

To obviate the possibility of the servo being injured by excessive pressure in case of gross mis-adjustment, a by-pass valve is provided which is set to open at a pressure of 150 lb. p. sq. in. Neither this by-pass valve nor the servo itself has any means of adjustment, this being unnecessary.

It was stated in the introduction that a part of the pressure of brake application comes directly from the pedal, while the major part is derived from the oil pressure generated by the pump. To understand how this is brought about it must be realized that when the servo is in action the pressure on the oil is uniform or practically so from the pump to the narrowest part of the valve passage, while beyond this latter point there

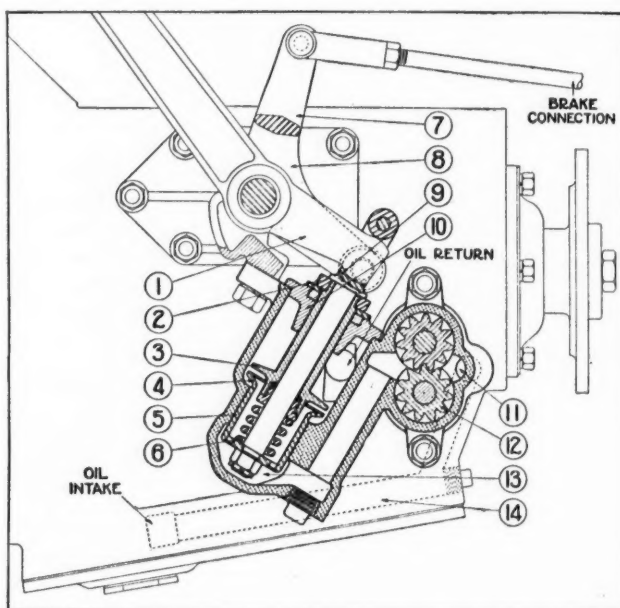


Fig 1—The Staude servo; section through pump and valve chamber

Getting Your Sales Ideas Across to Your Dealers

Simplicity and persistence must be practised by factories in presentation of sales promotion suggestions.

By Norman G. Shidle

REPETITION, pounding on a single idea until it is driven home, is the secret of successful advertising. Practically every automobile manufacturer carries out this principle in advertising his cars to the public.

The question raised by this article is: Why don't the manufacturers adhere more generally to this same principle in sales promotion literature prepared for dealers?

If you want to get a good idea across to your dealers present it in such a way that it can't be missed. And don't stop at one presentation. Keep telling 'em.

YOU can't learn anything from a man who doesn't know anything about the subject on which he is talking. On the other hand, nearly everyone has had the experience of being unable to learn anything from a man obviously familiar with his topic and recognized as an expert in his line. There is such a thing as knowing too much when the aim is to explain clearly to one who knows very little.

The very excellent and detailed analytical work which recently has gone into factory literature, talks and booklets designed to help dealers improve their merchandising methods probably has suffered a little now and then from the latter fault. Not so many years back, a good bit of the material sent by factories to dealers might have been criticised as containing much of attempted inspiration and little of really practical use. But today—whatever may be the faults of some material designed for public consumption—the data being given

by factories to dealers is for the most part full of ideas and suggestions which, if put into practice, undoubtedly would aid the retailer materially to increase both his business and his profits.

This great wealth of ideas, however, is applied effectively just in proportion to the success which the factory has in getting dealers actually to absorb it. It is hardly necessary at this stage of the game to emphasize that the mere inclusion of an idea in a bulletin sent to a dealer does not by any means insure even the acceptance—let alone the application—of that idea by its recipient.

It is often hard for a man writing dealer literature, or for factory executives in general, to realize fully how often it is necessary to express the same thought before acceptance of it by others is gained. Before the



To get an idea across to the dealer, state it in clear, simple terms and set it apart in such a manner that it stands out vividly in his mind. Don't give him more at one time than he can easily digest and don't fall into the error of assuming that one presentation will be sufficient to get the message home



A single idea usually needs to be dressed up in new clothes every week for many, many months and sent into dealer establishments by every door that is open before the factory can be sure that the idea has become a permanent part of the dealer's business household

factory finally prepares a booklet or manual on merchandising used cars, for example, a long period of study, collection of information and analysis of the problem takes place. When time for actual writing of the manual comes, the facts to be included and the conclusions to be drawn already are an old story to the man or group of men preparing it. Then they sit down to do the job. A statement of fact is made or a conclusion is given in one or two clearly written, simply phrased sentences; then another fact and another conclusion; then another and another until the manual is finished.

To anyone willing to read carefully each sentence, the ideas expressed will be clear as crystal. Every page will convey to such a reader perhaps ten or twelve sound thoughts for practical application in his daily business.

The manual may be sent out—and the factory may sit back to congratulate itself on having made possible a real advance in dealer used car methods.

The factory will be correct in believing that it has made possible such progress; but that probably is all that it has done—"made possible." For one dealer who will read and digest the material as outlined in the previous paragraph it is a safe bet that there will be fifty who could not pass even an elementary examination on the contents a week after receiving the manual. Only a man whose mind is more or less trained to study, to analyze and to think consecutively will get anything like maximum benefit from merely perusing such a manual or any other piece of trade literature of this kind.

Those factories which today are getting the greatest value from their sales promotion helps to dealers are backing up their original material with follow-up letters, calls of special traveling men, reiteration of the same idea many times under different guises, and other means of impressing on the dealer's consciousness the basic ideas which he needs as a part of his business equipment.

It sometimes may be very difficult for those who prepare such material to realize the amount of repetition necessary before even the simplest idea can be impressed on any great proportion of a dealer organization. It is difficult to keep clearly in mind how sparse is the background upon which the factory idea often is being thrown; to realize that an idea which may easily be assimilated by one who already has a good general knowledge and who habitually thinks more or less in abstract terms may be almost meaningless to the man who has done little, if any, coordinated thinking along the particular line before.

A single idea usually needs to be dressed up in new clothes every week for many, many months and sent into dealer establishments by every door that is open

before the factory can be sure that the idea has become a permanent part of the dealer's business household.

One of the best ways, of course, for factory executives interested in sales promotion to get the feeling of this situation—in addition to the mental understanding which most already have—is to spend a little time at least every month or so in actual contact with members of the dealer organization. Many a man who has prepared an able, concise factory booklet on sales, service, used cars or what not for dealer consumption would do well to change his usual procedure after having finished the brochure. Instead of sitting back with a sigh of satisfaction at a job well done and approved of by the boss, he might well rush out to the nearest dealer sales meeting he can find or, if such a gathering be unavailable at the moment, set out and spend the next day just visiting a few typical dealers in some of the smaller towns near the factory.

Often actual contact with a group of retailers is very potent in refreshing the memory as to just what sort of chaps these are to whom the factory literature is being directed, as to what they are thinking about and the terms in which they are thinking about it. The informal phraseology of the conversations the factory man will have with these dealers will contrast itself vividly with the more formal declarations of the recently completed brochure and the rambling character of the personal talks will turn out to be quite different from the logical sequence of the prepared discussions.

Then suppose he goes back to the factory. This sales promotion man will not change his brochure; he will not write it in slang and make it wander from point to point. He will not try to duplicate in his formal pamphlet the aimless informality of a chance conversation. There is no reason why he should, since one of the chief aims of his writing is to bring order out of chaos.

But he may begin to feel that with the issuing of that particular pamphlet his job is only begun, instead of being finished as he might have thought before. He will have a feeling, in all likelihood, that some further strenuous effort on the part of the factory is going to be necessary to get the dealers to read that pamphlet thoroughly; that further emphasis will have to be placed on the important points in following communications; that a mind which for the most part thinks quite casually is not likely to absorb at one gulp a closely knit, concise, well-reasoned discussion of any marketing point. And he may decide that it will be necessary to tell the same story over and over again long after it has begun to bore him personally in the full knowledge that such repetition and variation of the same theme is essential if he is to accomplish the objective for which he is working.

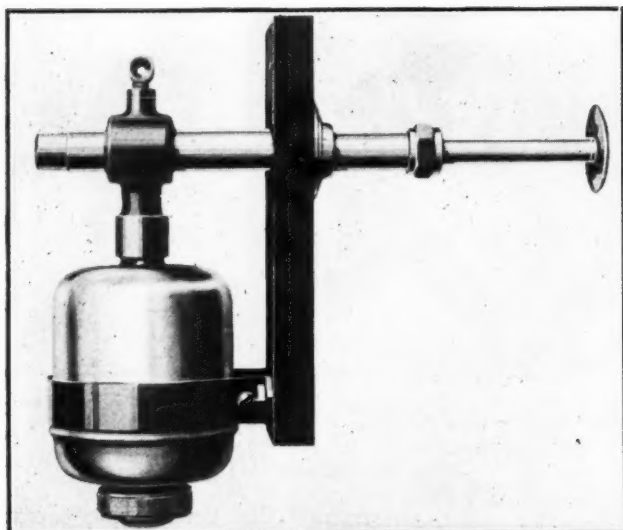


Fig. 1. Automotive type compressor shown mounted on dash

New Automatic Oiling System Developed for Motor Vehicles and Machinery

Farmer system provides for positive delivery of heavy oil in measured quantities to all bearing points from central reservoir. Plunger type of compressor is employed on cars.

By Leslie S. Gillette

POSITIVE delivery of a heavy oil in measured quantities to every bearing point from a central reservoir is the salient feature of a new automatic oiling system which is adaptable to automotive vehicles and industrial machinery. Invented in 1920 by A. J. Farmer, the complete device, after several years of testing and development, is now being produced in quantities at the plant of Farmer Lubricating Systems, Inc., Detroit, Mich. Several industrial concerns, including the Budd Mfg. Co., have adopted the system for the lubrication of conveyors, elevators and machinery, while two large automobile companies are experimenting with it on passenger car chassis.

Of importance in the operation of the system are the valves, which are designed to measure the required amount of oil for each bearing and to provide a positive shut off, so as to eliminate waste of lubricant. The compressor, designed to function with an oil such as 600-W, is capable of exerting a pressure of 1000 lb. This pressure, coupled with the design of the valves, is claimed to make the system immune from the effects of gravity, air pockets in the line, and the shape and length of the piping.

Principle Same in Both Cases

Whether used for chassis or machinery lubrication, the principle and units are identical except that in industrial applications where more than 50 bearings have to be oiled a screw type compressor operated by a hand wheel is employed. In plants which require several hundred feet of piping covering an unusual number of bearing points, special reservoirs, operated by a gear-driven compressor, are provided. In this way it is possible to lubricate shafting, motors and machinery almost instantly from a remote control point, with particular advantage when the points are inaccessible. Economy of labor and oil, elimination of accidents when oiling machinery, the assurance that no bearings will

be overlooked and deprived of oil, and that each bearing point receives the proper amount of lubricant automatically, are among the advantages claimed for this system by the manufacturers.

For automotive use, or for simple industrial applications, a plunger type of compressor is employed. Mounted on the engine side of the cowl with the shaft extending through to the front compartment, the device oils the chassis when the plunger is operated either by hand or foot. A particular feature of this system is that points above the chassis level, like the water pump, ignition distributor and fan, are oiled simultaneously with the chassis bearings. The reservoir of the normal size compressor is formed of pressed steel and has a capacity of $\frac{1}{2}$ pint, which is said to be sufficient for three to four months' driving.

As pressure is applied to the plunger, the oil in the compression barrel is forced into the feed line outlet. A ball check valve immediately below the reservoir allows the oil to run into the compression barrel when the

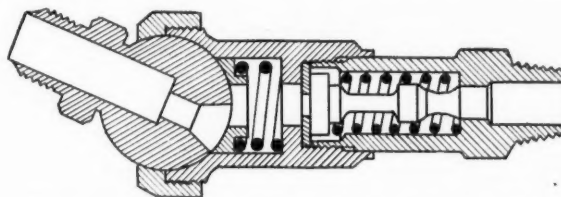


Fig. 2. Farmer measuring valve with ball joint

plunger is in the normal position, but prevents its return when pressure is applied. From the main outlet oil is distributed to the various points by copper leads with Dole double compression fittings. These fittings are made up in various combinations providing a range of two to six way outlets and in some cases embodying the measuring valve.

The layout of the piping is similar to that of other reservoir systems, the oil for the lower spring shackle bolts being delivered through drilled passages in the

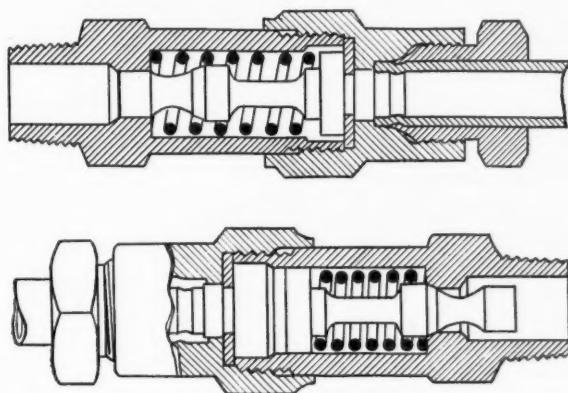


Fig. 3. Sectional views showing valve plunger at opposite ends of its stroke

side shackles with special ball joint fittings making connection wherever movement occurs, such as on the steering arm, axles, four-wheel brake mechanism and the drag link. The ball joint, a design of the Farmer Corp., comprises the ball proper, spring and spring washer, ball seat unit and the retainer nut. As will be seen from Fig. 2 the spring and spring washer keep the ball against the seat and nut. While the assembly has a 0.002 to 0.003 in. clearance between the ball and the seat, when the lines are full of oil and pressure is introduced into the line, the ball is forced against its seat, insuring an oil-tight joint. These complete units are formed also in various combinations to provide for sundry forms of outlets including $\frac{1}{8}$ in. male pipe threaded end and Dole compression nut end. In addition, certain of the ball joint combinations embody also the measuring valve as shown by Fig. 2.

The measuring and shut-off for the oil supply to each bearing point is accomplished by a valve shown in Fig. 3. Regulation of the amount of oil required by the respective bearings is determined by the length of the piston travel. The valve bodies are the same size as the pistons and the amount of oil delivered is dependent upon the distance of the valve closing face of the piston from the piston head. Thus, to vary the amount of oil it is necessary only to substitute a piston having a different position of the valve closing face.

In the upper valve shown in Fig. 3, the piston is back against the copper gasket, shutting off the main supply line with the system inoperative. As pressure is applied in the compression chamber, the oil forces the piston forward and the oil by-passes into the measuring chamber of the valve. When the pressure in the valve equals that in the line, the piston again moves forward, forcing the measured quantity of oil into the bearing. When the piston has traveled to the limit, as determined by the valve closing face in the center of the piston coming in contact with the valve seat of the valve body, no more oil will reach the bearing irrespective of the amount of pressure in the line. The lower view of Fig. 3 shows the piston valve closed against the seat. As pressure on the reservoir plunger is released, the spring forces the piston back to the position shown in the upper view and the system is ready for the next application of lubricant. This operation takes place simultaneously at every bearing point in the line.

In the industrial field, particularly for machine tools,

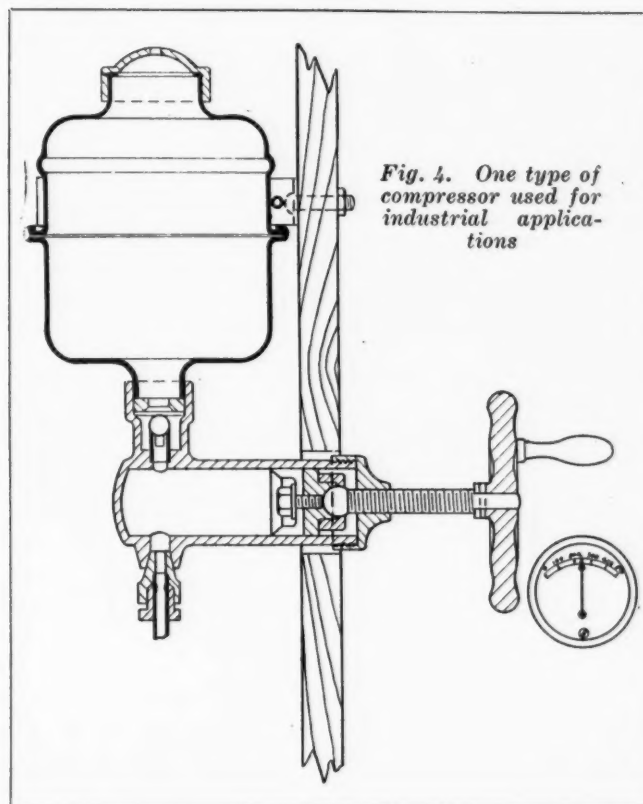


Fig. 4. One type of compressor used for industrial applications

screw type compressors are employed, although the remainder of the system, including the valves, fittings and joints, are the same as those employed for automobiles. Fig. 4 shows a cross section of an industrial compressor. With industrial systems a pressure gage is supplied which is mounted near the operating point and indicates to the operator when all valves have functioned properly.

Model 20 Edwards Railcar

THE Model 20 is the newest railcar built by the Edwards Railway Motor Car Co., Sanford, N. C. Fitted with an 11 ft. baggage space, seats for 42 passengers and a toilet, the car weighs 34,000 lb. with a total estimated operating cost, including depreciation and interest, of 14.4 cents per mile.

It is powered with a 100 hp. six-cylinder Buda engine which drives the forward trucks. When a trailer car is to be hauled also a second engine is installed and both forward and rear trucks are driven. A four speed transmission is operated through a multiple disk clutch. The entire powerplant is mounted in a sub-frame which is suspended within the regular truck frame by four cantilever springs. Double roller chain drive is employed from the engine to the drive axles.

Westinghouse air brakes are fitted to both trucks. The car body is of steel, strongly braced, with the interior finished in birch. Seats are upholstered in DuPont Fabricoid. Equipment includes air whistle, sanders, headlight, marker brackets, tools, fire extinguisher, 60 gal. gasoline tank, tool box and signal system. A Peter Smith hot air heating system is used.

The International Road Congress which concluded its deliberations at Milan, Italy, on Sept. 16, adopted a resolution to the effect that an international diplomatic conference should be called as soon as possible with the view of standardizing the methods of signaling in city streets by means of talking signals.

Recent Developments in High-Speed Chain Drives

An investigation of factors which determine noise and wear in chain drives. Large sprocket diameters essential to long life. Multiple roller chains are satisfactory at high speeds.

By George M. Bartlett*

Diamond Chain & Manufacturing Company

WHEN we speak of "high speed chain drive" we may mean either of two things: One capable of operating at high lineal velocities measured in feet per minute, or one capable of operating with sprockets running at high rotative speeds, measured in revolutions per minute.

When we speak of high speed chain we may refer to either of the well-known types of transmission chains: One, known in this country as the "silent" chain and in England as the "inverted tooth" chain; the other generally known as the roller chain. Assuming equally good design and workmanship, both types of chain are capable of operating at equally high lineal velocities, and where the same pitch and number of teeth are concerned, both are capable of equally high sprocket speeds. This discussion will have special reference to roller chains, since, so far as high speed applications are concerned, this type of chain drive has undergone the greatest development in recent years. But the main principles discussed apply in general to both types of chain.

My thesis may be stated in the following four sentences:

1. The limiting conditions in a chain drive are not determined so much by high chain velocity as by high sprocket speed.
2. High chain velocities are possible in light-weight chains of any pitch, but high sprocket speeds can only be successful with light chains of short pitch.
3. A single strand of roller chain can transmit only a limited amount of power at high speed, but when built in multiple widths the amount of power that can be transmitted at a given speed can be greatly increased, and the total field of usefulness of the type of chain can be multiplied eightfold.

4. Multiple strand roller chains are quiet.

If we are to explain how these conclusions were reached, we must give some attention to an analysis of the working principles.

The behavior of a chain drive is affected by such primary conditions as sprocket speed, horsepower, center distance, pitch and number of teeth; and such

secondary conditions as chain velocity, chain pull, chain length, angle of bend of links, weight of links, and projected area of rollers. Other influences are centrifugal force, friction, inertia and impact. To determine the exact effect of changing any particular condition we must assume other conditions to remain unchanged.

Let us assume a very simple chain drive in which the power transmitted is 10 hp.; the r.p.m. of each shaft is 600; the center distance between the shafts is 10 in., and the number of teeth in each sprocket is 12. The velocity ratio is then 1 to 1. What will be the effect on the wear of the chain if we double the number of teeth in the sprockets without changing any of the other given conditions?

For every twelfth of a revolution of a 12-tooth sprocket a chain link will turn through an angle of 30 deg. (one-twelfth of 360 deg.) as it wraps itself about the driving sprocket.

If the number of teeth is 24 instead of 12, each link will turn through an angle only half as great (Fig 1). This is offset by the fact that there are twice as many bends per minute. This is in turn offset by the fact that the pull on the chain is only half as great, since the sprocket diameter is doubled. And again, the chain length has increased from 32 pitches to 44 pitches and the wear is thus divided among more links. Altogether the amount of wear in each link of chain running over 24 teeth is only four-elevenths as great as when 12 teeth are used. This means that by

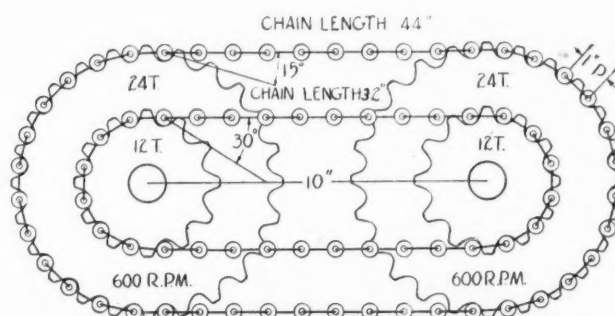


Fig. 1

* Paper presented to the American Gear Manufacturers Association at Briarcliff Lodge, N. Y., Oct. 14-16.

doubling the number of teeth, in this case the life of the chain is multiplied by 2.75.

Wear of chain pins is proportional to

$$\frac{\text{Angle of Bend} \times \text{Bends Per Minute} \times \text{Chain Pull}}{\text{No. of Links in Chain}}$$

Let N =number of teeth, S =r.p.m., H =horsepower, P =pitch, L =chain length in pitches, C =a constant.
Since

$$\text{Angle of Bend} = \frac{360^\circ}{N}$$

$$\text{Number Bends per Minute} = N \times S$$

$$\text{Chain Pull} = \frac{396000H}{S N P}$$

We have

Rate of wear of chain pins is proportional to

$$\frac{360}{N} \times N \times S \times \frac{396000H}{S N P}$$

or

$$= \frac{C}{N P L} \quad (\text{since } H \text{ is regarded as a constant.})$$

Other things being equal, the life of a chain is proportional to $N \times P \times L$, or to the product of the number of teeth by the chain length in inches.

There is another, far more important, advantage in using a reasonably large number of teeth, which has been explained in a paper previously read before this Association (April 27, 1921). It relates to the greater uniformity in the chain velocity and in the angular velocity ratio between the two sprockets due to the fact that the real pitch line of a sprocket is a polygon and not a circle, and that as the number of teeth increases, the polygon approaches more closely to a circle, and the pulsations in transmission are reduced.

Our next inquiry should be as to whether the action between the chain and the sprocket teeth has been affected in any undesirable way by the increase in the number of teeth from 12 to 24 and the accompanying increase in chain velocity from 600 to 1200 ft. per min. On first thought one might be inclined to say that, since the chain velocity is doubled, the rollers must approach the sprocket teeth with twice the velocity; but this is not so, for the impact between the roller and the sprocket does not take place in a direction parallel to the chain travel, but perpendicular to it; and the velocity of impact between the roller and the bottom of the tooth space is proportional to the angular velocity of the approaching link about its pin.

The angular velocity of a chain link as it turns about its pin in the act of seating itself between the sprocket teeth is always equal to the angular velocity of the sprocket itself and is independent of the number of teeth or of the chain velocity. Hence, if the r.p.m. remains unchanged and an increase in chain velocity does not increase the impact between the chain rollers and the sprocket teeth, we might conclude that high chain velocities are not objectionable so long as there is proper action between the chain roller and the sprocket teeth.

There are three factors that may affect the correct action between chain links and sprocket teeth under high lineal velocities that would have little or no effect at low velocities. These are:

- (a) the inertia of the individual links as they are forced to change their direction of motion at the moments of approach to, and departure from, the sprockets;
- (b) the viscosity of the lubricant surrounding the pins which resists rapid flexing of the links;
- (c) centrifugal force which tends to throw the chain toward the tops of the sprocket teeth.

The effect of the first two factors, inertia and vis-

cosity, is observable in almost any chain drive running at high speed where there is sufficient slack in the chain. It is most noticeable at the points where the slack run of the chain is leaving the driving sprocket. At these points the chain seems to cling to the sprocket and to resist the act of unwrapping. This condition seems to have no ill effect upon the drive and is not regarded as a deterrent to high chain velocities. The sprocket teeth have no part in this phenomenon, as was formerly supposed, and this is evident from the fact that the same thing occurs when there are no teeth and the chain is simply wrapped about a pulley. Furthermore, if an endless chain is simply hung vertically over a single driving sprocket and driven at high speed, the lower portion

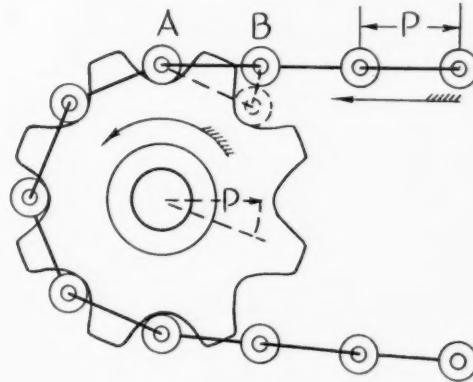


Fig. 2

will behave in the same way where it is flexing on the upward run, although it is wrapped about nothing at all.

Centrifugal force is probably the only factor that produces a measurable effect on the action of the chain at high lineal velocities.

If a chain is wrapped half way around a sprocket, the tangential force tending to break the chain would be

$$F = 0.0000043186 W V^2 \text{ lbs.}$$

where W is the weight per ft. of the chain, and V is the chain velocity in ft. per min.

The radial force tending to throw the chain away from the sprocket is 6.2832 times as great or

$$F' = .0000271 W V^2$$

The average weight of a standard roller chain per ft. is $1.63 P^3$ lb. Centrifugal force varies as the weight of the chain and as the square of its velocity. If the pitch is 1 in. and the velocity is 1000 ft.p.m. the tangential stress will be 7.04 lb., and the radial stress will be 44.17 lb.

Increase of Tangential Stress

If the velocity is increased to 2000 ft.p.m. the tangential stress will be four times as great, or 28.16 lb.; and the radial stress will be 176.68 lb. This shows that wherever the chain is under a load greater than 28.16 lb., at 2000 ft.p.m., the tangential stress of 28.16 lb. due to centrifugal force will be overcome, and the chain will function properly. The normal load on such a chain will usually run from 150 to 300 pounds at that speed, and it is safe to say that velocities as high as this will not disturb the proper functioning of the chain so long as the chain tension is sufficient.

A further study of chain action reveals the fact that the tension decreases progressively as we pass around the sprocket from the driving strand of the chain to the non-driving strand; and there is always a particular point where the tension due to driving is

zero. From that point on to where the chain leaves the sprocket, the tension again increases until it is equal to that produced by the weight of the slack strand of the chain.

A small amount of slack is desirable, and chain drives will usually run well when there is considerable slack in the chain. But where the velocity is so high that centrifugal force affects the correct action near points where the pull is low, it is necessary to take up most of the slack in order to avoid the tendency of the rollers to "top the teeth." If this is done, very high chain velocities can be attained.

It has been demonstrated, both in theory and practice, that the ancient prejudice against high lineal velocities for roller chains was not founded upon a proper observation of the facts.

When we turn our attention from chain velocities to sprocket speeds, expressed in r.p.m., we reach the conclusion that where there is undue wear on sprocket teeth accompanied by high chain velocities the trouble is usually caused by high sprocket speed and not by high chain velocity.

As engagement takes place between a chain and sprocket, (Fig. 2), each link *AB* turns about its pin *A* with an angular velocity equal to the angular velocity of the sprocket. Hence, the linear velocity of the roller *B* along the arc *BC* is equal to the linear velocity of a point on the sprocket at a distance from the center equal to the pitch *P*. This velocity of impact is independent of the number of teeth, or of the angle of bend of the link, or of the chain velocity. It depends only upon the r.p.m. of the sprocket, and pitch of the chain.

When the force of impact becomes too great, it is destructive to both rollers and sprocket teeth. Hence, it is important for us to investigate this subject and see whether it will throw any additional light on the design of high speed chain drives.

The energy of one impact between a roller and a sprocket is proportional to the weight of a chain link and to the square of the velocity of impact. The destructive action between a roller and the sprocket is proportional to the energy of impact divided by the projected area of the roller (length \times diameter). The velocity of impact is proportion to the r.p.m. of the sprocket and to the pitch of the chain. Hence, the destructive action is proportional to

$$\frac{MV^2}{A} \text{ or } \frac{MP^2S^2}{A} \text{ or } \frac{WP^2S^2}{A}$$

where *M*=weight of one link of chain (lb.)= $WP/12$; *W*=weight per ft.; *V*=velocity of impact (ft.p.m.); *A*=projected area of roller (sq. in.); *P*=pitch (in.), and *S*=r.p.m. of sprocket.

Now, the maximum value that this expression for destructive action can take in average practice has been found from experience to be about 4,000,000.

$$\frac{WP^2S^2}{A} = 4,000,000 \text{ (max.)}$$

$$S \text{ max.} = \frac{4,000,000A}{WP^2}$$

$$S \text{ max.} = \frac{2000}{P} \sqrt{\frac{A}{WP}}$$

By examining this formula we can see at once that if we wish to attain high sprocket speeds we must keep the pitch short, the weight of the chain low, and the roller area high.

Applying this formula to the standard series of roller chains, we have the following list of maximum r.p.m.s which we can use as a guide in selecting the pitch of a chain before designing the drive.

AVERAGE HORSEPOWER					
Chain No.	Pitch (in.)	Max. r.p.m.	Single Chain	Double	Triple
30W	$\frac{3}{8}$	3600	1.5	3	4.5
40W	$\frac{1}{2}$	2600	2 $\frac{1}{4}$	4.5	6.75
50W	$\frac{5}{8}$	1900	3 $\frac{1}{2}$	7	10.0
60W	$\frac{3}{4}$	1500	5	10	15
80W	1	940	0	18	27
100W	1 $\frac{1}{4}$	645	13	26	39
120W	1 $\frac{1}{2}$	520	19.5	39	58
140W	1 $\frac{3}{4}$	370	23.25	36.5	69.5
160W	2	325	31.5	63	94.5

The sprocket speeds shown in the third column are the highest advisable speeds for any type of chain whether roller or tooth type; and in practice where conditions allow it the speeds are usually not more than 75 per cent of those given in the table.

The important deduction to be drawn from this research is that short pitch chains of light weight and ample width are necessary for high speed drives. But if short pitch chains must be used for high speeds, then we must either confine the use of roller chains to light loads wherever high speeds are desired, or we must provide a special type of roller chain designed for light weight, short pitch and large roller area.

To do this it is only necessary to build up standard roller chains of short pitch in double, triple and quadruple widths, and to give proper attention to accuracy and precision of manufacture of the chain parts and also to correct and uniform heat treatment of bearing surfaces. While precision of manufacture is important in single roller chains used for high speeds, it is of even greater importance for multiple widths. With chains of this design it is possible to transmit two, three and four times as much power at a given speed as was formerly the practice; and it is also possible to transmit a given amount of power at three, or four times the maximum r.p.m. possible with single width standard chains.

Moreover, it is a noteworthy fact that such chains are found to operate much more quietly than chains of single width. The cause of noise in a chain drive is not thoroughly understood, but we feel fairly certain of two facts:

First: Some chain drives are noisy because of the acoustic conditions connected with the installations. The base or the casing may act as a first class sounding board, or as a resonator. The same drives more favorably mounted may run very quietly. This phenomenon is observable with chains of both the roller and the tooth type.

Second: A chain whose links are built up laterally of a number of similar parts will run more quietly than when each link is practically a solid mass throughout its width. The note struck by each unit in a given link will be softer; and it is possible that where the sound wave from one unit is slightly in advance of that in another, there is a tendency to neutralization in comparative sounds. This seems to be the only way in which we can explain the fact that roller chains of double and triple width are, in general, more quiet than single width chains.

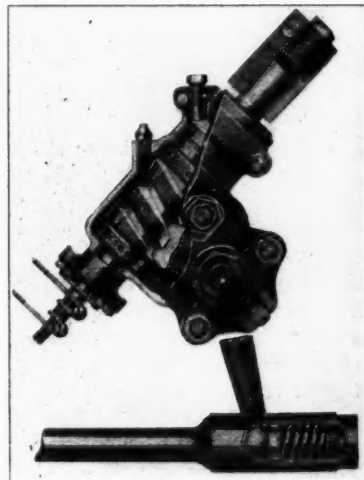
Changes in the Dodge Engine

THE photographs below illustrate some of the engine changes made recently by Dodge Brothers, Inc., as announced in *Automotive Industries* of Sept. 30. Since that date several additional improvements have been announced. Whereas the oil pan and the flywheel dust cover formerly were a one-piece stamping, they are now separate and the dust cover is being made of cast iron. The oil level indicator is now located immediately behind the carburetor and several slight changes

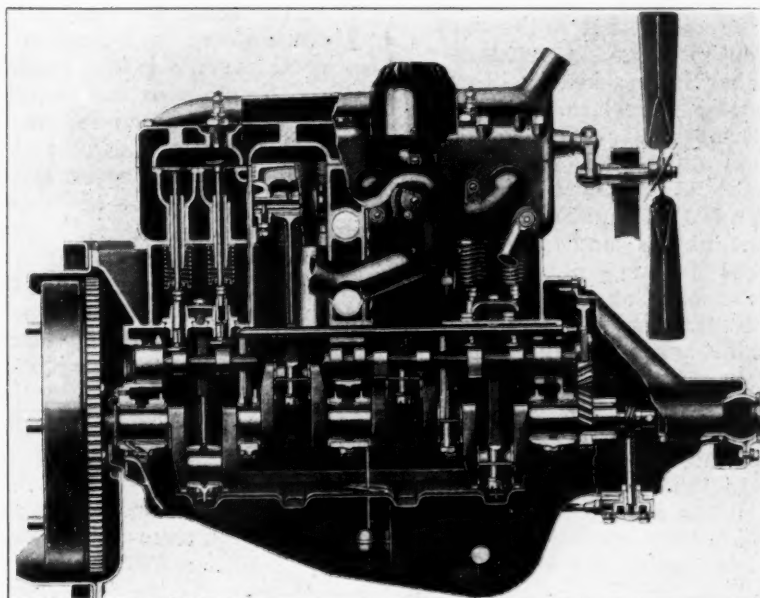
have been made in the oiling system. With the placing of the starter on the flywheel housing, where it engages with the flywheel gears by a Bendix drive, it was necessary to alter the carburetor bowl and the breather. Another change involves the exhaust valves, which are now of one-piece silchrome steel construction. The dimensions of the bearings of the new five-bearing crankshaft are the same as for the previous three-bearing type— $1\frac{3}{4}$ in. in diameter and $1\frac{1}{4}$ in. in length.



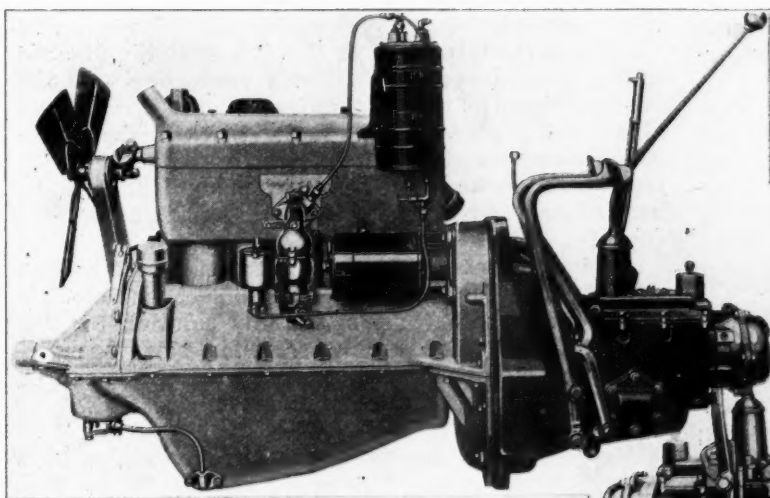
ABOVE: The new Dodge five-bearing crankshaft which is 10 lb. heavier than its three-bearing predecessor



LEFT: A new type of steering gear employing the worm and sector mechanism with a 10 to 1 reduction is employed

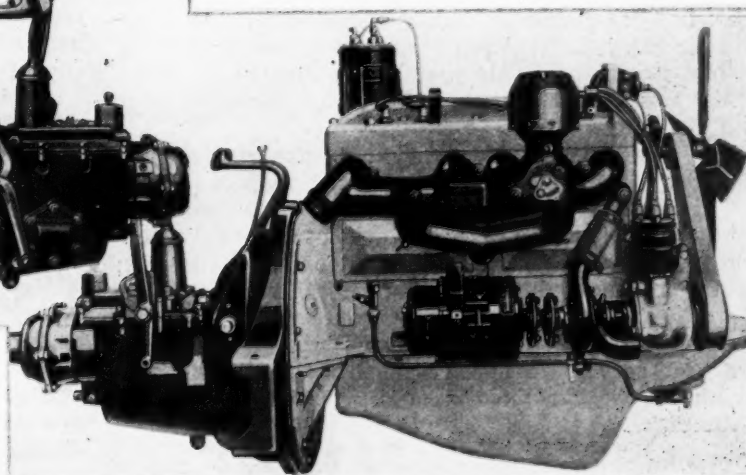


Cross section of the improved Dodge powerplant. The most important change is the incorporation of a five-bearing crankshaft. Camshaft, connecting rods and pistons remain as before



ABOVE: Left-hand side of engine. The large 12-volt generator-starter has been removed from the front and a 6-volt starter placed at the rear to engage with the flywheel by the Bendix drive

BELOW: View of right-hand side of Dodge engine, showing new location of the 6-volt generator which is driven off of the water pump shaft. It will be noted that the coil has been placed on the cylinder head, where it is more accessible



Electric Railways Spending \$23,000,000 This Year for Bus Equipment

Scientific coordination of rail and motor transportation is regarded as only solution for local transit problems.

By Alfred H. Swayne*

Vice-President, General Motors Corp.

WILL the motor bus replace the trolley car—that is the question most of us constantly either hear asked or discuss among ourselves. Without attempting to give you the final answer, I would call your attention to certain things that appear to be important as indications of what is happening in the transportation field.

Regarding the ability of motor buses to handle mass transportation, a few pertinent facts that must be considered as conclusive evidence on the subject are found in the following:

In 1924 all tramways in Metropolitan London carried 968 million passengers as compared to 1 billion 484 million carried by motor buses; in 1925 the tramways carried 978 million and the buses 1 billion 671 million, or an increase of 12.6 per cent, whereas the tramways increased only 1.1 per cent, a clear indication that over there the people like bus transportation.

The lesson I learn from studying these figures is, first, that the motor bus is capable of moving masses of people, and, secondly, that we cannot afford to ignore what others are accomplishing with the same tools we must use in solving problems in transportation that basically are quite alike.

Three hundred electric railways in America now operate more than 6000 motor buses over 12,000 miles of routes. Akron—the old chestnut, where buses failed, etc.—now has express buses operated by the local electric railway. It is reported that out of 300 million dollars being spent this year by the electric railways of the country, 23 million is for motor bus equipment and facilities.

The convenience of personal transportation has changed the desires of the people with respect to public transportation. Local transportation demands have changed; as we expect to get hot and cold water when we turn the respective taps in our bathrooms, so the riding public expect to find transportation facilities “on tap” when they want to ride.

Generally speaking, electric railways still render the best service in mass transportation, but people living off the car lines want service closer to their

THAT local transportation will soon settle down on a basis of fair earnings for good service is the opinion expressed by Mr. Swayne in this article. He says: “Electric railway companies that are directed by men of vision and courage will probably control the transportation facilities—rail and bus—of their respective communities.

“If they won’t see the light, and continue to view motor bus transportation as a passing fancy, then the business will be divided among them and others who are willing to give the service the people demand.”

doors than it is possible for rail lines to give. Others prefer to ride on rubber, and are willing to pay for it. The wise local transportation man will carefully survey his field and give the people the service they want. Of course, he will not attempt to satisfy whims and give a service which will not pay a fair profit.

I believe that local transportation will soon settle down on a basis of fair earnings for good service. Electric railway companies that are directed by men with

vision and courage will probably control the transportation facilities—rail and bus—of their respective communities. If they won’t see the light and continue to view motor bus transportation as “a passing fancy,” then the business will be divided among them and others who are willing to give the service the people demand.

Not only must the transit facilities meet a necessity, they must fill a convenience in every sense of the word. This is 1926, not 1900. As a people we are more exacting and I believe we are willing to pay the price for this kind of transportation when assured of value received.

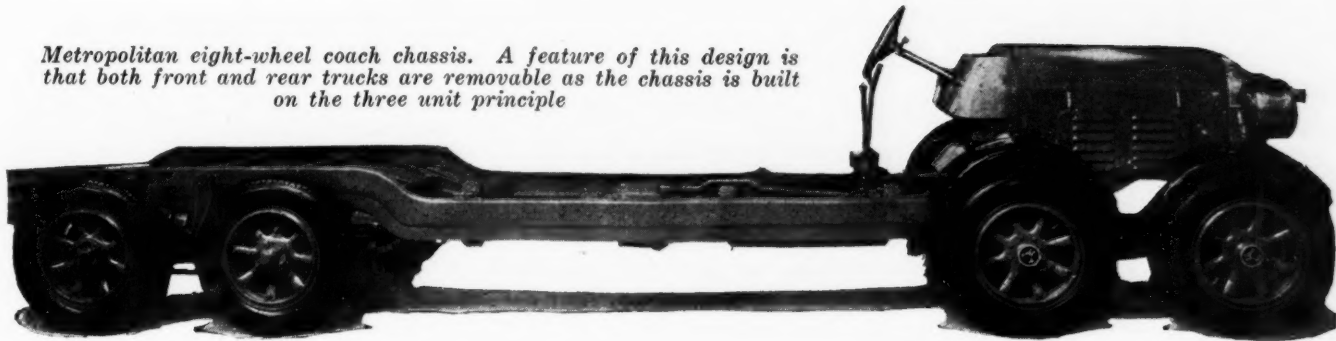
I would call attention to the fact that the electric railways are frequently not only concerned with the transportation of passengers by motor bus, but have also found a place for the motor truck in the transportation of freight. Where electric railways handle freight the motor truck can in many instances be used to great advantage and, therefore, its usefulness should be studied.

Automotive men with whom I am associated believe that a proper and scientific coordination of electric railway and motor bus is the only solution for our local transportation problems. This new transportation tool, the bus, must be used wherever it can be done to advantage and without prejudice.

URUGUAYAN import duties on automobiles have been increased. The new rates are 39 per cent ad valorem on passenger cars valued up to 1000 pesos; 44 per cent on passenger cars valued above 1000 pesos and up to 3000 pesos, and 49 per cent on those valued above 3000 pesos. These represent increases of 10, 15 and 20 per cent, respectively. Trucks and tractors are exempted from duty.

* Portion of a paper presented before the American Electric Railway Association, Cleveland, Ohio, Oct. 7, 1926.

Metropolitan eight-wheel coach chassis. A feature of this design is that both front and rear trucks are removable as the chassis is built on the three unit principle



Metropolitan 8-Wheel Bus Powered With Continental "6" Engine

Newcomer in bus field has wheelbase of 201 in. and overall length of 336 in. Normal road speed is 35 m.p.h. Air brakes on all wheels. Springs are Coppock permanent rebound type.

AS mentioned in a previous issue, an eight-wheel bus chassis was displayed for the first time at the A. E. R. A. show at Cleveland by the Metropolitan Coach & Cab Corp., Cleveland. It is powered by a Continental, six-cylinder, $4\frac{1}{4}$ by $5\frac{1}{4}$ in. engine with $2\frac{1}{2}$ in. diameter crankshaft, which develops 72 hp. at 1500 r.p.m. The crankshaft has seven bearings.

Forced feed lubrication from a gear type pump is employed. Bosch magneto furnishes ignition, and an Autopulse dual pump gasoline feed is used. Zenith $1\frac{1}{2}$ in. carburetor, North East generator and self-starter unit, Brown-Lipe multiple dry disk clutch and four-speed transmission are all standard.

The springs are Coppock permanent rebound type. The four front springs are 40 by 2 in. and the four rear ones 56 by $2\frac{1}{2}$ in. They are all mounted in shackless ball centers and provision is made for adjustment at each end.

The main frame is of pressed nickel steel, heat treated, $9\frac{5}{8}$ in. deep, $\frac{5}{16}$ in. thick and provided with six tubular cross members. The front sub-frame, which is demountable as a complete unit, is made of $\frac{1}{4}$ in. pressed steel 6 in. deep. The rear sub-frame is of $\frac{1}{4}$ in. pressed steel, $8\frac{1}{2}$ in. deep and is provided with five tubular cross members. It also is demountable.

Large Braking Area

Christensen air brakes of the expanding type are provided on all eight wheels, giving a total of 836 sq. in. of braking area. Ross cam and lever steering gear is used mounted in three units to facilitate servicing.

The clutch is also air operated. The rear axle is of the spiral bevel type, mounted dual with a gear ratio of 4.77. In the front axles the wheel loads are taken on thrust races of the taper roller bearing type to give easy steering qualities.

Parker cast steel bus type wheels are standard and pneumatic tires are fitted all around. From the specification table it is evident that the chassis can be supplied as a gas-electric unit with General Electric equipment, if desired.

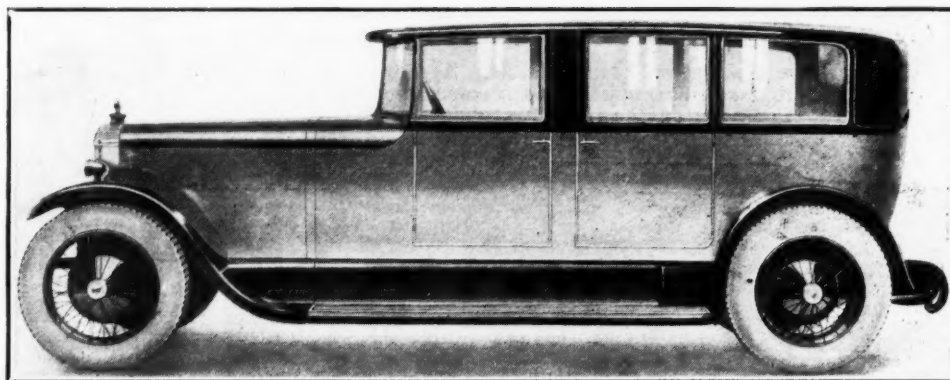
Wheelbase is 201 in. from center to center of trucks. Overall length is 336 in. Height to top of frame is $24\frac{1}{2}$ in. Overall width is 88 in. Front wheel track is $65\frac{1}{2}$ in. and that of the rear wheels $66\frac{3}{4}$ in. Turning radius is 35 ft. Normal road speed is 35 m.p.h. with a maximum of 50 available.

A DEVICE registering the number of bumps per mile which depress the front springs of a test car more than one inch has been used by the Minnesota State Highways Department and is known as a roughometer. The degree of unevenness or the size of the obstruction required to depress the front springs one inch depends of course on the stiffness of the springs and on the rate of speed at which the car is being driven, but any road department, of course, can standardize these factors. The bumps are not merely recorded, but their intensity is integrated, as it were, the records made by individual bumps varying from one-thirty-second of a point to two points or more.

On a recent test made by O. L. Kipp, construction engineer of the department, and F. C. Lang, engineer of tests, one piece of pavement was found on which 528 points were recorded. This, however, had been built before the state trunk highways system was established and has carried several thousand vehicles a day for several years. The minimum on pavement was 56 points in a mile, and most of the pavements built by the state showed from 80 to 150 points a mile. Some of this was on new construction, where the expansion joints had not yet been smoothed down.

The minimum on gravel was 105 points and the maximum recorded was 445, but the latter was on a road so rough that it was necessary to slow down and dodge around holes. A much higher record would have been made if the average speed of 35 miles an hour had been maintained, as was done on the pavement and the better gravel roads.

Daimler "Double Six"
with landaulet body on
163 in. wheelbase
chassis



Daimler "Double-Six" Has 435 Cu. In. Piston Displacement

British 12-cylinder car, which is to be marketed here by the Stearns Motor Co., featured by Lanchester worm drive, 4-speed gearset, vacuum brakes, two carburetors and two water pumps.

By M. W. Bourdon

THE new Daimler-Knight sleeve valve model which, as reported in *Automotive Industries* of Sept. 9, is to be offered for sale in this country through the agencies of the F. B. Stearns Motor Co., is a 12-cylinder "double-six" with a piston displacement of 435 cu. in. It has the same bore and stroke as the 25-85 hp. six-cylinder Daimler, viz., 81.5 x 114 mm. and many of its parts are therefore interchangeable.

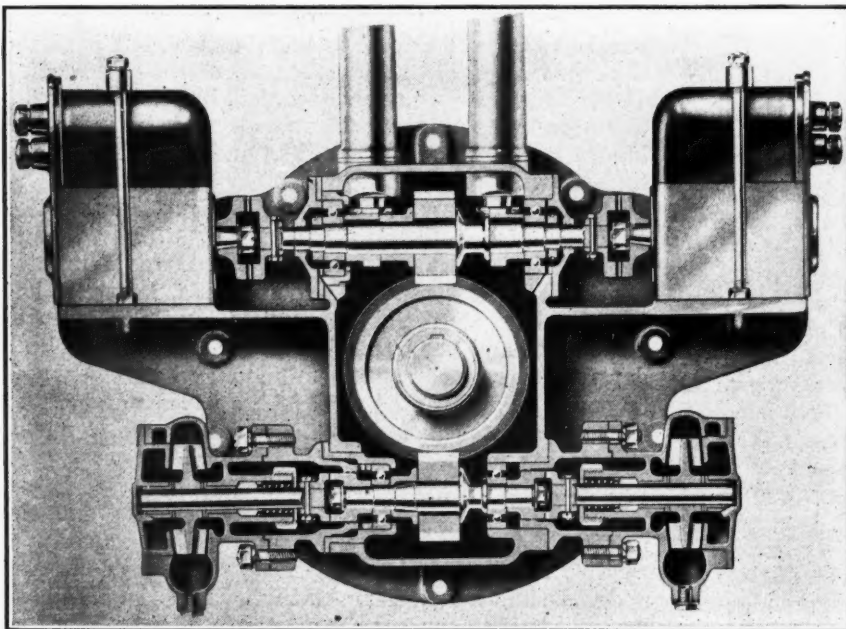
The cylinder blocks are set at an angle of 60 deg.

on the aluminum crankcase. The drive of the sleeves is by two small crankshafts, one at each side in the top half of the crankcase, the front end drive being by inverted tooth chain. The main connecting rods are forked. The small connecting rods for sleeve operation are of duralumin. At the front end of the crankshaft, outside the crankcase, is a Lanchester torsion damper, which also serves as a pulley for the fan drive.

Driven by helical gearing from the crankshaft at the front end are two transverse shafts on ball bearings; the upper one drives a magneto at each end and, by bevel gearing, two vertical shafts, enclosed in aluminum standards that support the two distributors of the coil ignition. The lower transverse shaft drives a water pump at each end.

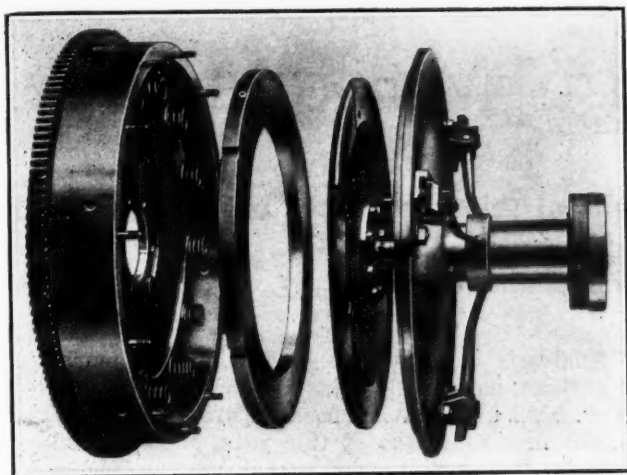
The two carburetors are on the outside of the cylinder blocks and are of the standard Daimler seven-jet type in which a gravity type piston valve with a dash-pot uncovers the jets in succession. The mixing chambers are water-jacketed. Besides the seven jets is one for starting only, which is positively closed when the throttle lever is moved forward to the normal slow-running position. Coupled to the starting jet lever is a water valve in the uptake branch to the radiator. Pressure lubrication is used.

The aluminum pistons are unusual, for between the walls of the split skirt are helical springs ex-



Cross section of front end drives for magnetos, pumps and coil ignition distributors

erting outward pressure to prevent piston slap without risk of seizure when the engine becomes warm. Five rings are fitted, viz., three compression type in the crown, with oil drain holes below them, then a scraper ring in a groove with more drain holes, while



Dismantled units of clutch on Daimler "Double Six"

below that is a second scraper ring without drain holes. The connecting rods are clamped to the piston pin, which floats in the piston bosses.

Exhaust and water manifolds are the only units located in the space between the cylinder blocks. The induction tract is on distinctive lines. From the water-jacketed mixing chamber a passage leads up through the induction manifold to a cast aluminum jacket surrounding the water return pipe. The mixture passes through the annular chamber from the center toward both ends, where it descends into the aluminum inlet manifold, which inclines slightly toward the center. The advantages claimed for this arrangement are uniform distribution and effective vaporization.

Carburetor air is taken from an exhaust pipe muff through a duct cast integrally with the wall of the crankcase, and thence through a pipe to the jet chamber. No air is taken from the crankcase.

The four-blade fan rotates under a half cowling that extends to the rear of the engine, enclosing the space between the cylinder blocks and carrying a current of air past the exhaust manifolds.

Engine and four-speed gearset are separately mounted on the frame, with dual fabric disk joints between clutch shaft and primary gearshaft. The clutch is of the dry, single-plate type, with twelve short helical springs located by recesses in the flywheel. They press rearwardly upon a steel ring that is free to move axially and in turn bears upon the driven plate, the latter being split radially with fabric facing on the front side only. The other fabric facing is attached to the clutch cover plate, while the

latter on its rear face carries three operating levers taking effect upon pins that pass through to bear upon the floating member for clutch withdrawal.

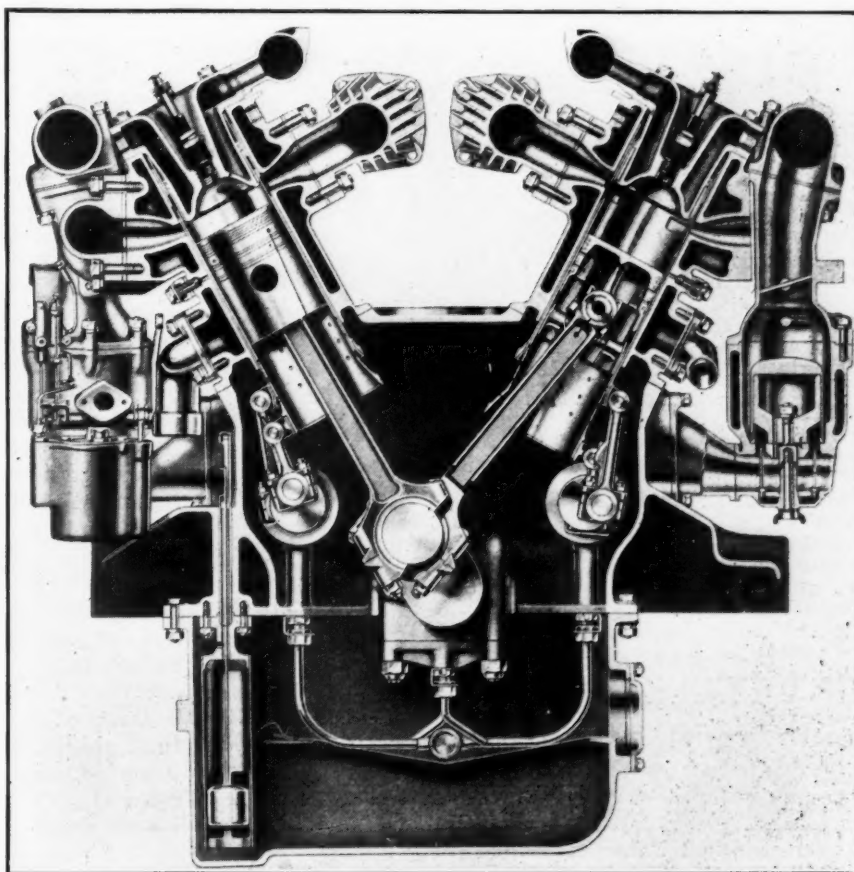
The shift lever is carried in a spherical bearing by a bracket projecting over the clutch coupling shaft. The brake lever is on the right of the driver and operates an internal transmission brake. The four-wheel brakes are pedal-actuated through De-wandre type vacuum equipment.

An open propeller shaft with ball-bearing metallic universals is used, while the final drive is by Lan-chester worm with a ratio of 4.37 to 1.

The steering gear arrangement is unusual, for the gear casing is bolted to the rear face of the aluminum dashboard, well above the pedals. The lever attached to the worm gear shaft projects forward through the dashboard and from it a link runs down to a bell-crank supported by a bracket on the side rail of the frame. The vertical arm of the bell crank serves the purpose of the usual drop lever. This arrangement avoids crowding the space under the hood on the right of the engine and keeps the steering column well clear of the pedals.

Wire wheels are fitted, with Dunlop cord balloons, the tire sizes varying from 33 x 6.75 in. to 37 x 7.3 in.

The car is made in two lengths of wheelbase and two treads, the larger car having a wheelbase of 163 in. and a tread of 60 in. and the smaller one a wheelbase of 156 in. and a tread of 57 in. Turning circles for the two models have radii of 54 and 52 ft., and the weights of the chassis are 4760 and 4700 lb., respectively. The cars carry a fuel tank with a capacity of 24 Imp. gallons and are said to have a fuel mileage of 10 to the Imp. gallon. Prices range from £1850 for the short chassis to £2800 for the 163 in. landaulet.



Cross section of Daimler 12-cylinder engine

American Motorcycles Make *Steady* *Gain* in Foreign Markets

Exports during first eight months of this year 7 per cent ahead of corresponding period of 1925. Australia and Japan continue as the leading markets.

AMERICAN motorcycles are steadily gaining in popularity abroad. This is indicated by Department of Commerce figures which show an increase in exports of about 7 per cent for the first 8 months of 1926 as compared with the corresponding 1925 period. Units exported during the 8-month period this year numbered 15,868, valued at \$3,418,658. For the same period of 1925 the units numbered 14,830, valued at \$3,356,298.

Registration statistics, revised to June 30, 1926, show that a total of 1,435,147 motorcycles were in circulation throughout the world on January 1, 1926, or almost 200,000 more than the number estimated as of January 1, 1925.

Australia continued to be the leading market for American motorcycles during the period under review, 2992 units having been exported to this country in the first 8 months of this year, as compared with 2415 in the similar 1925 period. Japan, the second leading market, absorbed 1568 motorcycles from the United States in this period, while Germany and Sweden, the third and fourth on the list, accounted for 1504 and 1300 American machines, respectively.

Exports to each of the five leading markets showed a very appreciable gain, this increase amounting to 25 per cent for Australia; 60 per cent for Japan; 90 per cent for Germany; 45 per cent for Sweden, and 24 per cent for Canada.

Germany a Good Customer

It is interesting to note that Germany has risen from ninth to third place as a market for American motorcycles in a space of a year, while on the other hand, Italy, who took 960 units for the first 8 months of 1926 as compared with 1550 a year ago, dropped from second to seventh place in importance. Other important markets to which American motorcycle exports have decreased to a measurable extent during the past year are Netherlands, Czechoslovakia, Finland, Switzerland, Belgium, and Soviet Russia.

The accompanying table shows the principal foreign markets for American motorcycles during the first 8 months of 1925 and 1926.

In spite of the intense competition that American motorcycle exporters will encounter abroad from European and especially English manufacturers, the outlook for a steady increase in the use of the American product is favorable. The strengthening in American motorcycle exports during the past year is in a large measure due to the superiority of American light machines, sales of which have been of gradually increasing importance in many markets as compared to the heavier types.

Many Europeans and Asiatics who cannot afford to drive automobiles because of their initial higher cost and larger fuel consumption find the motorcycle the answer to an important need. This class probably accounts for the largest number of potential buyers in many of the lesser developed countries of the world. In Egypt, American machines are popular and well introduced, and although Great Britain still supplies more than half of the motorcycle requirements, the United States is forging ahead and now supplies fully one-fifth of the demand. In Japan the United Kingdom has always had the lead in supplying the market, but American makes are now making great strides

Principal Foreign Markets for American Motor Cycles

Exports first eight months 1925-1926				
	No.	Value	No.	Value
Australia	2415	563,118	2992	629,771
Japan	981	210,091	1568	344,373
Germany	793	181,090	1504	330,939
Sweden	899	201,283	1300	282,014
Canada	830	176,074	1035	225,823
British South Africa	991	220,919	967	209,189
Italy	1550	341,075	960	196,029
Netherlands	906	208,041	801	164,054
New Zealand	753	173,165	765	166,337
Denmark and Faroe Isl. ¹	308	66,305	650	135,970
Czechoslovakia	816	182,720	450	94,833
Java and Madura	228	52,804	408	86,077
Austria	126	29,193	278	63,100
Norway	69	15,244	162	36,625
Finland	191	40,550	148	32,560
Venezuela	77	19,262	130	31,005
Brazil	44	11,561	127	26,546
Switzerland	131	29,311	113	23,831
Soviet Russian Europe ²	277	67,155	93	23,876
Mexico	92	24,938	93	21,453
Argentina	90	22,699	85	20,222
Philippine Islands	22	5,453	82	18,418
Belgium	111	24,059	80	18,341
Peru	46	7,664	74	16,982
China	85	17,243	74	15,722
Salvador	38	7,104	74	16,816
British India	52	11,631	64	13,859
British Malaya	63	12,801
Portugal	118	29,777	59	11,512
Spain	51	12,815	46	9,770
Others	1742	403,954	623	139,810
Total	14,830	3,356,298	15,868	3,418,658

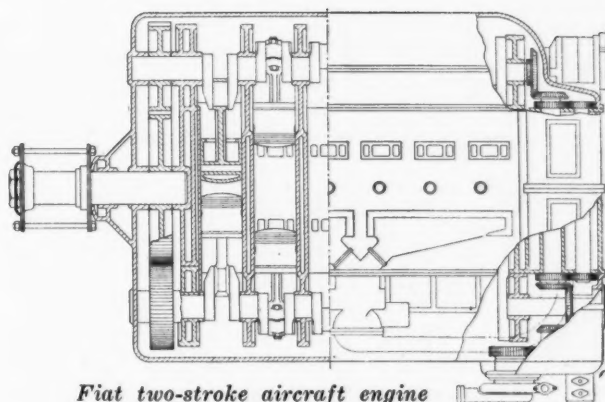
¹Does not include Faroe Islands.

²Russia in Europe.

and dealers are optimistic that 1926 will be a record year for the sale of American-made machines.

While it has been difficult to secure reliable figures for most countries as to the per cent of American-made motorcycles to the total number in circulation, estimates have been made wherever they could be based on available statistical data, such as import and registration figures. These estimates are given for a number of countries in the following table:

	Per Cent American Motorcycles (Estimated)
Aden	12
Angola	50
Argentina	87
Australia	40
Belgium	65
British Guiana	65
British Malaya	3
Colombia	85
Costa Rica	80
French Indo-China	8
Germany	10
Guatemala	95
Hongkong	55
Japan	55
New Zealand	50
Norway	75
Palestine	4
Peru	28
Poland	60
Porto Rico	100
Siam	12
Spain	20
Sweden	45
Switzerland	15
Union of South Africa	25



Fiat two-stroke aircraft engine

Fiat Two-Stroke Engine

WE have already published a sketch of the Fiat two-stroke engine as developed for racing purposes. It appears that this type of engine is intended chiefly for aircraft purposes and a patent on it has been taken out in England. The drawings accompanying the patent specification give additional details to those shown by the simple sketch which we published in a previous issue and one of the patent drawings is reproduced herewith. It will be noticed that in this case, too, there are six parallel horizontal cylinders, each containing two pistons which connect to cranks at opposite ends of the cylinders, and that the two crankshafts are connected to the central propeller shaft by spur gears.

A supercharger (apparently of the Roots blower type) is located at the opposite end of the engine from the propeller and is driven from the crankshafts through bevel gearing. The drive for the water pump and the magneto is also indicated.

How to Interpret U. S. Automotive Statistics

IN reply to a recent inquiry regarding the proper interpretation of its statistics on domestic production, foreign assembly and exports, the Automotive Division of the Bureau of Foreign and Domestic Commerce says:

Do not add the unofficial figure brought out each month covering cars of American design assembled abroad to the domestic production total if it is intended to arrive at the grand total of American cars produced in a given month.

It is likewise a mistake to add the foreign assembly figure to the monthly automobile unit export total from Canada and the United States. Such addition would involve serious duplication since a substantial portion of the American cars assembled abroad have already been declared as units exported.

The Bureau goes on to explain: "It is required by both the Canadian and United States Customs services that automobile parts for assembly and engines for assembly going to foreign branch factories be declared as complete units exported whenever the parts and engines in a shipment are sufficient for assembly abroad into a given number of complete automobiles. Such parts and engines as are in this manner declared as complete units exported are considered and reported by the manufacturer as units of Canadian and United States 'home' production.

"There are certain 'automobile parts for assembly', as also 'engines for assembly', which are parts and engines that, although in the course of time resolve themselves into complete cars of American design cannot be identified and thus declared as car units at the time of exporting. Until such time as we are able to translate the 'parts for assembly' and 'engines for assembly' returns into complete unit equivalents, it is suggested that the unit export totals be utilized as also the United States and Canadian production totals, without any additions or subtractions.

"We will continue, for the present, our practice of reporting on the extent of the assembly abroad each month of automobiles of American design. These data will be subject to frequent corrections and will serve only to point to the trend of such operations abroad and in no case are to be considered as supplemental to any other statistics we present.

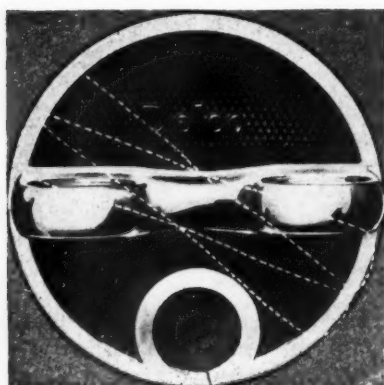
"Through the splendid cooperation of industry our automotive statistics, both as pertaining to production and exports, are steadily improving. Yet there seems to exist some misunderstanding as to just how certain of these statistical data should be used. This often leads to confusion for the manufacturer and exporter of automotive products which it is hoped may be cleared away by these few explanatory remarks here."

NEW DEVELOPMENTS—Automotive

New Type Ignition Lock

A NEW type of ignition lock which requires the driver to remove the key before the engine can be started and which locks itself when the ignition is switched off is fitted on the latest of the "E" series Oldsmobile cars. The lock is of Delco make and is built integral with the ignition switch and induction coil, all three being protected by a steel housing. The construction of the unit, together with the system of wiring, makes it impossible for the thief to "wire around" the switch.

To start the engine, the key must be inserted in the



New Delco ignition lock as used on the latest Oldsmobile

lock and given a half turn. Before the horizontal switch lever can be turned to the "on" position, the key must be removed. With the lever turned to the "on" position, a steel disk painted red closes the key hole, thus preventing the driver from putting the key back into the switch with the ignition on.

When the lever is snapped back to the "off" position to stop the engine the switch is locked automatically and the key hole is uncovered again. In order to meet the demands of certain motorists who desire to switch off the ignition temporarily, as in the case of descending hills or for a short stop, the design of the lock has been modified and a "curb stop" position embodied in the switch.

To use the "curb stop," the driver has to be cautious to move the lever only a little way back in the direction of the horizontal "off" position. Too much pressure will take the lever into the "off" position where the system is locked automatically and where it will be necessary for the driver to use the key before the engine can be started. In the "curb stop" position the red steel disk partly uncovers the key hole, but it is not enough to allow the key to be inserted.

Hatfield Resilient Wheel

THE Hatfield Resilient Wheel Co., Baltimore, Md., has developed a combination wheel and tire which is designed to combine the cushioning qualities of pneumatics with the durability of solids. The wheel consists of a hub about which is a pneumatic tube inflated to about 20 lb. pressure. Outside of this is a circular plate to which short spokes are attached ending in a solid rubber tire of small dimensions.

The outer unit of spokes and solid tire is held in place by steel plates on either side of the hub so that no lateral movement is possible. In operation all shocks are said to be absorbed by the inner inflated tire just as they are with ordinary pneumatic tires, but use of solid tires in contact with the road provides longer tire life, easier steering, elimination of punctures and all road troubles, and decreases tire costs.

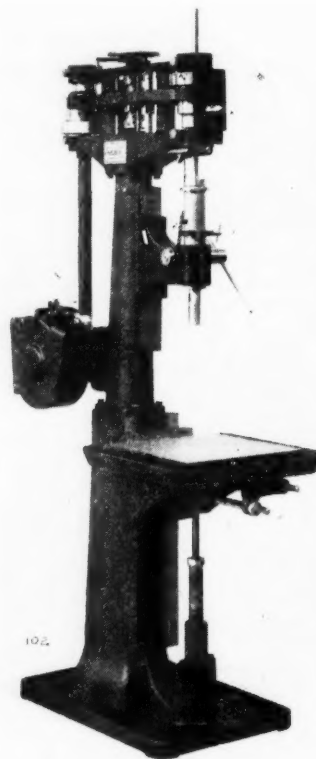
Fosdick High Speed Drills

TWO new models have been added to the line of drilling machinery manufactured by the Fosdick Machine Tool Co., Cincinnati, Ohio, and are known, respectively, as the No. 3 and the No. 4 high speed, ball bearing, sensitive drill. These machines are built in both single and multi-spindle types, with or without power feed, motor drive, pump and fittings, and tapping attachment.

No. 3 bench-type machine is built in one to four spindles, while the No. 4 pedestal type can be supplied in one to six spindles. Both machines are built in 16 and 24-inch sizes, and have a capacity of $\frac{3}{4}$ -in. in drilling and $\frac{1}{4}$ -in. in tapping. All revolving parts are equipped with ball bearings.

The belt-driven machines are furnished with tight and loose pulley, swiveling belt guard and shifter. The drive is through helical gears running in oil. Shifting of the belt on the four-step cone is accomplished by means of a central cam drum, so that the belt is shifted from one step of the cone before it is advanced on the other cone. Before shifting the belt the tension is taken from it automatically by the operation of the idler cam, which releases the tension on the idler.

These machines are equipped with a four-step cone. The adjustable spindle collar mounted on the spindle sleeve can be set to disengage the feed at any desired depth. A liberal channel for chips and lubricant is provided on the tables. On the No. 4 pedestal-type the table is adjustable on the pedestal by means of telescopic screws and can be raised and lowered and then securely clamped by means of a lever in front. The head is adjustable on the column and can be rigidly clamped in position.



Fosdick pedestal-type, high speed, sensitive drill

Parts, Accessories and Production Tools

Footburt No. 3 Sensitive Driller

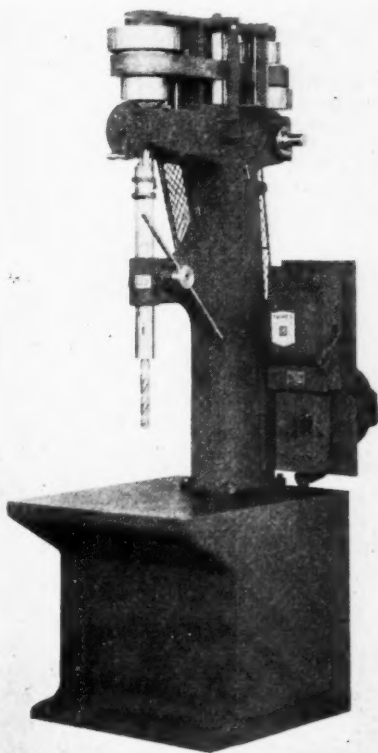
A NEW sensitive drilling machine brought out by the Foote-Burt Company, Cleveland, O., and known as its No. 3, has a capacity of $1\frac{1}{4}$ in. in cast iron and $\frac{3}{4}$ in. in steel. It has many of the features of the smaller Footburt Sipp sensitive drilling machines, including the quick-change speed arrangement, simple drive and automatic swinging idlers, and it is designed for production work.

The machine is designed for one particular job, although it is possible to use various types of jig on the box-type table, so that the machine can be used for other jobs should it be found necessary. The original distance from the spindle nose to the top of the table can be set to suit the requirements of the individual purchaser. By using a filler block under the upright, this distance can be increased if it should be desirable.

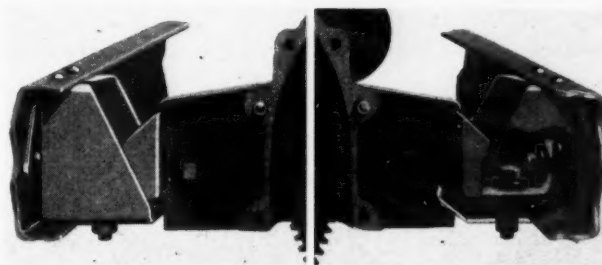
The spindle is made from high carbon steel, and is mounted in bronze bushings in the spindle sleeve. Two keys are used for driving. The spindle is $1\frac{3}{8}$ in. in diameter at the driving end. It is bored to receive a No. 3 Morse taper.

A cabinet base is a feature of this machine, and is so arranged that two or more machines can be bolted together, thereby forming a gang machine, with a distance of 15 in. between spindle centers. After the first unit is purchased, additional units can be added as production increases, so that a number of units may be handled by one operator. The right hand end of the pulley shaft is arranged for coupling to the left hand end of the drive shaft of the next unit, so that a number of units, depending on the size of the cut, can be driven with one drive arrangement.

It is possible to equip this machine with automatic power feed, similar to that used on the BW and BX Sipp sensitive drilling machines. The machine can be arranged for either motor or belt drive. The illustration shows it arranged with motor drive. When belt-driven, the tight and loose pulleys are mounted in the same place as the single pulley shown in the illustration.



No. 3 Footburt
sensitive drilling
machine



These views show the method of securing the Oakland powerplant to the chassis. On the right side will be seen a phantom view showing the thick rubber pad placed between the engine and the frame which acts as vibration damper and reduces also the transmission of engine noises to the chassis and then to the body

Oakland Engine Mountings

ON the Oakland "rubber silenced chassis," cushioned engine mountings play an important part in reducing the transmission of chassis noises. All Oakland cars are now being shipped with this feature. To the outer ends of each of the rear crankcase arms a steel supporting bracket is bolted. The outer end of this bracket is turned up at right angles, providing a channel section form. The support arm riveted to the chassis side rails is of the usual 90 deg. bracket type.

When the engine is lowered into the chassis, a flat rubber pad $\frac{3}{8}$ in. thick, 4 in. wide by $4\frac{1}{32}$ in. long is placed between the engine arm support bracket and the chassis bracket. The outer end of the rubber pad is brought up at right angles to fit between the outer end of the crankcase bracket and the chassis side rail. Two $\frac{1}{2}$ in. bolts at right angles to one another are used to secure the engine bracket to the frame on each side of the chassis. One bolt passes through the outer turned up end of the engine bracket, then into the rubber pad and finally through the frame, while the other bolt passes through the lower part of the arm, then through the rubber and into the lower side of the frame bracket. Both the bolts are insulated from the support arm by small rubber bushings encased in a cup-shape metal washer. The bolt holes through the support arms are $\frac{3}{32}$ in. larger than the bolts to secure complete insulation of the engine from the frame.

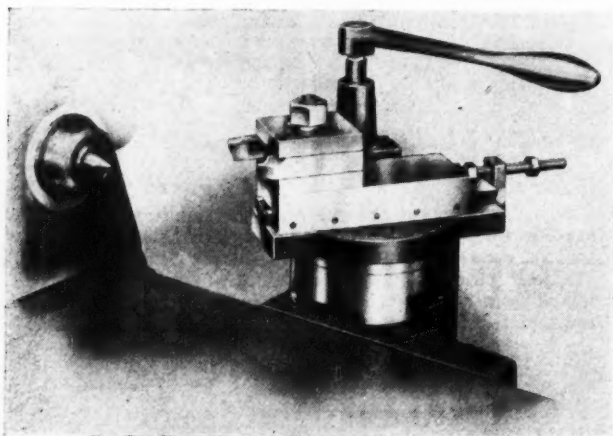
With the adoption of this method of securing the rear of the powerplant it is interesting to note that no changes were necessary in the crankcase arms or frame. An additional advantage of bringing the rubber pad up at right angles between the end of the arm and the frame is that it prevents any tendency of the engine to move sideways on its supports.

Angular Facing Attachment

MOUNTED on the tailstock ways of a lathe, this device, manufactured by the Porter-Cable Machine Co., Syracuse, N. Y., may be moved to any position on the bed, while the swivel feature allows the tool to be turned at any angle to the work, and fed in by hand at the desired speed. An adjustable stop regulates the depth of cut. Its position on the ways

and the angle of the cutters are maintained by screws which rigidly clamp the attachment when desired.

An open type tool holder is mounted on the carriage, which is slid forward or backward on dovetailed ways by the action of a rack and pinion connected with the handle. This in turn is mounted on a swivel plate which may be turned in any direction and clamped. The supporting member is a strongly ribbed



Porter-Cable lathe attachment

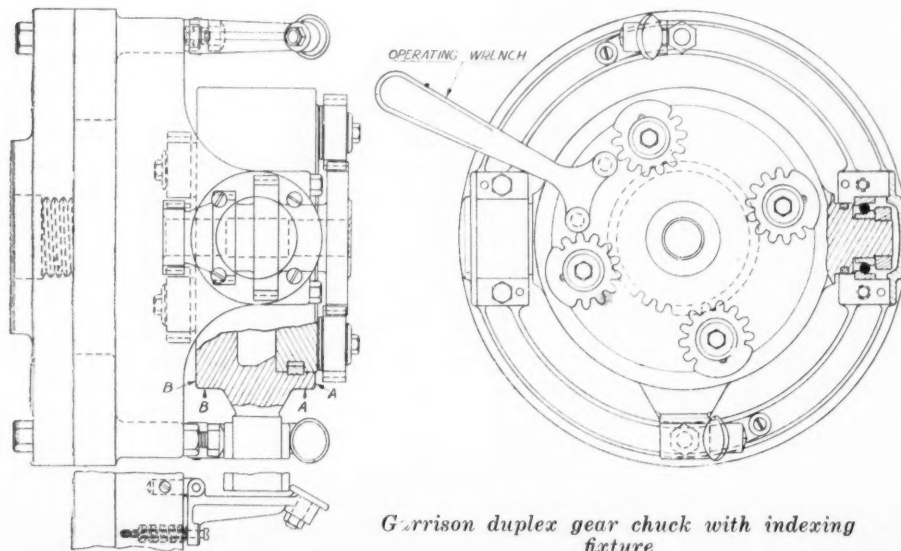
casting while the moving parts are of steel. In addition to its suitability for angular work, such as facing gear blanks, this attachment is useful for chamfering and necking work before or after turning.

Chuck for Cluster Gears

GARRISON MACHINE WORKS, of Dayton, Ohio, announces an adaptation of its standard Duplex gear chuck to an indexing fixture for the purpose of accurately grinding deep holes of relatively small diameter for each end. After the hole has been ground to the desired depth from one end of the gear, the chuck is indexed through 180 deg., thus presenting the opposite end of the hole to the wheel so that the remainder of the hole can be finished.

This method permits of the use of a shorter and stiffer wheel spindle than would otherwise be possible, thus promoting greater accuracy and speed in grinding.

The standard Garrison duplex chuck is provided with an indexing lug and with trunnions for rotation of the chuck on ball bearings. The ball bearings are supported



Garrison duplex gear chuck with indexing fixture

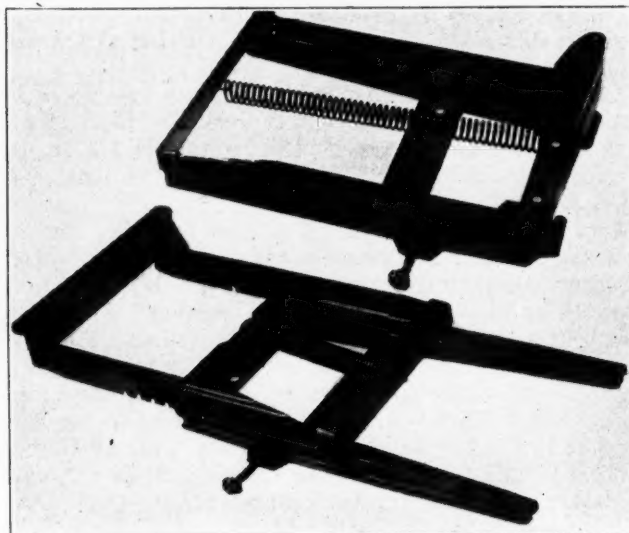
in a rigid symmetrical base. When the fixture is mounted on the face-plate of the grinder work-spindle and trued up from the surfaces AA and BB, it requires no further adjustment.

Latches automatically lock and hold the chuck in either position, and they are released for indexing the chuck by a touch of the operator's finger.

In operation, the gear is inserted in the chuck, located and locked in position on the pitch circle of the teeth by means of a removable operating wrench. Both ends of the gear are locked or unlocked simultaneously by one movement of the operating wrench.

Van Auker Adjustable Seat

SEVERAL novel features are found in the movable seat for two-door five-passenger closed cars just placed on the market by the Van Auker Co., Pontiac, Mich. While of the sliding variety, the seat may be tilted forward and in this position the roller tracts fold up with the seat and eliminate any protrusions on the



AT TOP: Coil spring in tension with the seat frame in practically the fully extended position toward the rear

BOTTOM: Seat frame shown with the spring almost closed and with the seat carried to the maximum forward position. Note knob which by pulling out and releasing provides several different settings in the 8 in. of travel the seat provides

floor. The unit may be applied to the present seats of most two-door 5-passenger cars.

Formed of pressed steel stampings throughout and weighing 7 lb., the attachment can be installed in less than 30 minutes. The entire seat is held rigidly in the same position as the regular seat and the hinges which allow the entire seat to fold forward coincide with the position of the hinges used with the regular seat.

The movable element consists of two frames, the lower one providing the track rails for the rollers with the upper frame attached directly to the original seat cushion frame. The hinges are secured to the lower frame. A heavy coil spring keeps the seat extended to the maximum position forward while a slight

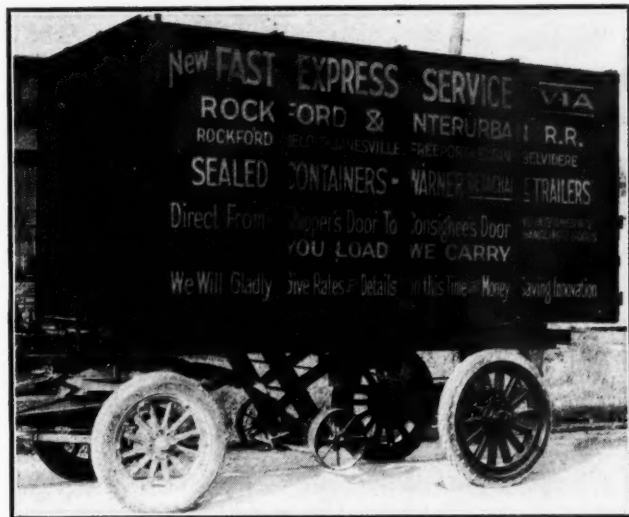
pressure backward on the part of the passenger pushes the entire seat to the rear against the spring.

Notches in the upper frame runners provide for variations in seat travel up to eight inches. Operation of the seat for different settings is by pulling out and releasing a knob placed on the lower frame. A positive fold back catch keeps the seat in the desired position and it is claimed by the manufacturers that by leaving the seat free, the spring tends to absorb road shocks and make for easier riding.

Individual Freight Containers

THE Rockford & Interurban Railway of Wisconsin, operating through Beloit and surrounding towns, is installing a system whereby less-carload-freight shipments can be packed by the shipper in individual containers, locked, and transported to the consignee without rehandling and always under lock and key.

The system consists of six Warner automatic detachable semi-trailers, 20 removable bodies for the trailers, and tractors to haul them to and from the freight



Detachable trailer with removable body used for door-to-door deliveries

depots. When a shipper announces that he has a shipment to make, a tractor hauls a trailer and body to the shipper's door where the trailer is dropped. The body may then be run off the trailer and into the shipper's warehouse, if desired, and loaded. It is then locked and returned to the trailer.

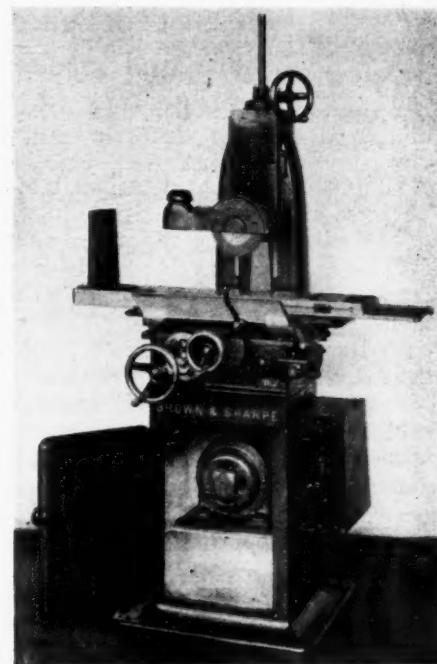
Upon notification, the railroad tractor comes and picks up the loaded trailer and runs it to the nearest rail terminal, where the body is run into a car direct from the trailer. At the delivery end of the trip the process is repeated and the body is unloaded by the consignee. The bodies are 12 ft. long, 5 ft. 10 in. high and 6 ft. wide. A railway car can accommodate three of them. Maximum weight to be carried in any body is not expected to be more than 6 tons.

In addition to this installation it is understood that six other electric railway companies are considering the adoption of similar methods to give door-to-door delivery service.

Surface Grinding Machine

THE latest addition to the Brown & Sharpe line of "complete-unit" machine tools is the No. 2 surface grinding machine which has the motor in the base,

where it is completely protected from oil, dirt and water. As may be seen from the accompanying illustration, the motor, which is of the constant speed type, is mounted on a plate which in turn is secured to a shelf in an oil-tight compartment in the machine base. Ventilators cast in the door provide sufficient circulation to ensure effective cooling of the motor. Space under the motor shelf can be used for the storage of



Brown & Sharpe
No. 2 motor-in-
base surface
grinder

attachments and machine accessories. An option is given on several makes of motors, either d.c. or a.c.

Power is transmitted by means of a belt running over a system of pulleys. A tightener automatically keeps the belt at the proper tension regardless of the height of the spindle head. The control box is located on the side of the base, with the push-button control in a convenient operating position.

Longitudinal table travel and transverse movements are automatic, the latter being provided with an automatic stop which "throws out" at any desired point. A knurled knob on the front of the machine disengages the power cross-feed when only the longitudinal feed is wanted.

The machine accommodates work up to 18 in. long, 6 in. wide and 9½ in. high, when a wheel 7 in. in diameter is used. 65 in. x 30 in. of floor space is required and the net weight of the machine without motor is 1350 lb.

A NEW piston ring making use of cork to obtain a good seal has been put on the market by the Cork-Sealed Piston Ring Corp., 2332 S. Michigan Ave., Chicago. A specially constructed cork gasket is fitted into the inner surface of the ring so that when the ring is fitted on the piston the cork sets snug up against the piston surfaces with the metal surface of the ring coming in contact with the cylinder wall.

It is claimed for these rings that they securely seal all gas leaks, preventing oil dilution and giving better engine performance. The cork seal is treated to 500 deg. of heat and is guaranteed not to burn, char or disintegrate. It is compressed under 20 tons pressure. Another advantage claimed is the low wall tension, averaging three to eight pounds, preventing excessive wear.

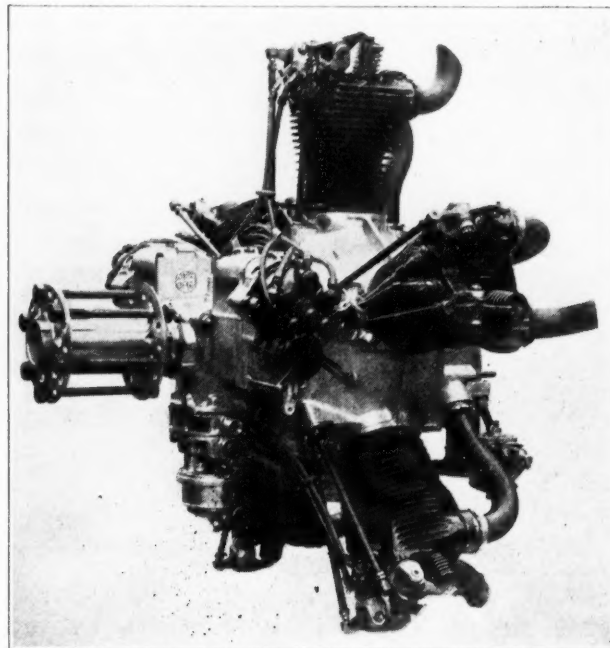
Armstrong-Siddeley in Field With Light Air-Cooled Aircraft Engine

"Genet" designed for production on commercial basis. Has 4 in. bore and stroke, develops 65 hp. at 1850 r.p.m. and weighs 168 lb. Is of static radial type with five steel cylinders.

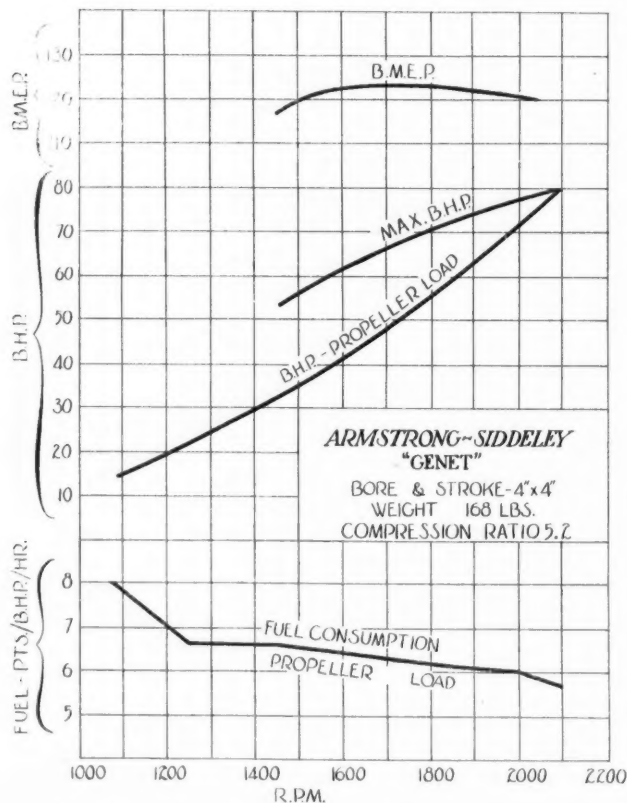
ALTHOUGH designed primarily for the *Daily Mail* light airplane competition, in which it scored considerable success, the Armstrong-Siddeley "Genet" air-cooled aircraft engine has been developed on lines that will allow it to be produced on a commercial basis for use in light airplanes. This new engine, which marks the entry of the Armstrong-Siddeley motors into the light airplane engine field, embodies a good deal of the design of the "Jaguar" and the "Lynx".

Similar to these engines, the "Genet" is of the static radial type. With a 4 in. bore and 4 in. stroke, it develops 65 hp. at 1850 r.p.m. with a standard compression ratio of 5.2 to 1. At its rated horsepower, fuel consumption is approximately .5 pt. per hp. hr. and the oil consumption .03 pt. per hp. hr. While the compression ratio is not very high, it has been found that best performance is obtained with a fuel composed of 80 per cent aviation gasoline and 20 per cent benzol.

The 5 cylinders which are of steel are screwed into steel adapters in the aluminum crankcase where they are locked with a double cone lock ring. The aluminum alloy heads are shrunk, screwed and lockringed on to the barrels, the valve seats and spark plug bosses being



Armstrong-Siddeley "Genet" air-cooled engine



Performance curves of "Genet" airplane engine

shrunk into the head. There are two inclined overhead valves per cylinder, the exhaust being of cobalt chrome and the inlet of stainless steel. Duplex valve springs and tubular steel push rods are actuated by roller ended tappets, driven by a half speed camshaft which in turn is driven by the crankshaft through the medium of two epicyclic gears.

Following current practice in radial engine design, the crankshaft bearings are of the ball type, the front main bearing taking the propeller thrust, while the propeller radial loads are taken by a plain type of bearing in the front cover, which bearing also serves as an oil retainer, the oil passing through it to the crankshaft from the oil pump.

The master rod is of one-piece construction while the auxiliary rods are of H sections. Pistons are forged of aluminum "Y" alloy similar to a number of American aircraft engine pistons and are fitted with four rings, three of these being above the floating piston pin and an oil scraper ring being fitted below. The bottom ring of the upper three is also of the oil scraper type.

As assembled for the *Daily Mail* competition, the complete engine with a single magneto, carburetor, air intake, short exhaust pipes, propeller, hub and speedometer drive weighed 168 lb. The overall outside diameter of the engine is 32.6 in., while its length overall is 36.1 in.

EDITORIAL

Oil Engines for Aircraft

THE importance of the development of the heavy oil engine for aircraft purposes is emphasized by some of the recent fatal accidents. Diesel engine fuel is practically non-ignitable by ordinary means and it is practically inconceivable that there would have been any fatalities in connection with the attempted trans-Atlantic flight had the tanks been filled with fuel oil instead of with aviation gasoline. Similarly, the loss of life in the recent accident to a French cross-channel air liner might have been avoided.

The difficulties in the way of reducing the weight of the Diesel engine until it is substantially on a par with the carburetor-type aircraft engine seem to be very great, but it must be remembered that the present type of aircraft engine is the result of some twenty years of consistent development, carried on for part of the time with practically unlimited funds, while development work on oil engines for air transportation has hardly begun.

While the safety feature is undoubtedly the greatest inducement toward the development of the oil engine, other advantages are also in sight. The weight of fuel consumed per horsepower-hour would be less with the compression ignition type of engine, hence the engine weight need not be quite as low as with the carburetor type to achieve the same radius, while with an equally light engine the radius would be increased. Furthermore, the fuel cost would be greatly lowered, which should be an important factor in making the airplane commercially practical or economically self-sustaining.

Over-Geared Transmissions

TRANSMISSIONS with one combination which gives a higher vehicle speed than the direct-through drive are no novelty. They were used by Winton, among others, years ago, but they never achieved any great popularity and in recent years they entirely disappeared as a regular production feature.

At the present time there seems to be a marked tendency to return to the over-geared transmission, but the objects aimed at are somewhat different and the technical progress in gear manufacture which has been accomplished in the meantime has eliminated some of the objections to the earlier gearsets of this type.

American drivers have always shown a preference for cars that would take practically every ordinary grade on high, and to make this possible it was necessary to use a large rear axle reduction. But a large rear axle reduction meant unpleasant engine vibration at high car speeds and also a cut-

ting down of the maximum car speed. The object of the earlier users of the over-geared transmission apparently was to make up for this loss in maximum speed.

Today the range between maximum speeds in the open country and the regular driving speeds in congested city streets is wider than ever before. There is less objection to changing gear while in the upper speed range than when near the lower limit, because conditions change much less frequently on the open road than in city streets. Two factors may contribute to the silencing of the over-geared fourth speed—the development of gear grinding, and the use of internal gears instead of spurs, the former having a much larger number of teeth in simultaneous contact and when submerged in oil affording an effective oil cushion.

There are two outstanding advantages of a transmission having an over-geared fourth speed. Provided the over-geared speed is as pleasant from the silence standpoint as the direct drive, it will be used a great deal of the time, and the engine will not have to run at excessive speeds under any conditions, which speeds are very detrimental to its life. Secondly, a good deal of fuel will be saved, as the engine will develop more torque and less speed, and its efficiency is largely dependent upon its torque and almost independent of its speed (above the usual idling range).

Buses Force Improvement

MARKED improvements have been made in trolley car design in the last four or five years. Many of the recent designs are more comfortable, less noisy and more pleasing to the eye than were their prototypes of the last decade.

Probably the motor bus can take some share of the credit for inducing the trolley car design advances of recent years. With the advent of the motor bus and the demonstration of its ability to handle mass transportation successfully, the trolley lines were confronted with a competitor possessed of good riding qualities, attractive appearance and quiet operating characteristics.

The public began to display a very considerable liking for these qualities of the newcomer, and thereby furnished at least one incentive to changes in electric car design which before had been lacking. Thus it seems reasonable to give the motor bus credit, not only for its own direct achievements in providing for the public comfortable, pleasing transportation, but also for having influenced, perhaps to a large extent, provision of these same qualities in trolley cars to a greater degree than the latter vehicles ever before had possessed them.

AUTOMOTIVE **NEWS SECTION** INDUSTRIES

Philadelphia, Pennsylvania

Thursday, October 28, 1926

Offering New Models Early Shortens Seasonal Market

PHILADELPHIA, Oct. 28.—Motor car manufacturing operations are now somewhat below the seasonal average. Unsatisfactory market conditions in the South is one of the principle causes of the recession; another is the fact that the manufacturers went into high production of new models this year earlier than usual and were able more quickly to satisfy the demand for the improved vehicles.

The extent to which the factories have been out of the steel market for some time is an evidence of a widespread policy of inventory reduction, while curtailment of output is relaxing pressure on the dealers, most of whom are now comfortably stocked with new cars.

Most elements of the industry appear to be resigned to the prospect of a quieter period after the record-breaking first three quarters of 1926. In former years, when the fall months were particularly stimulated by sales of closed cars, the situation was different; now the all-year-round demand for the closed vehicles has reduced the expectancy of special demand for such cars in any season.

With minor exceptions, the motor car companies are in good condition to operate on a reduced basis for some months. Conservative dividend policies coupled with high earnings earlier in the year have placed them in a strong financial position; and on the manufacturing end inventories are low and costs have been declining slightly.

A wave of price-cutting might reduce profit margins to the danger point, but so far the reductions have not been regarded as a definite downward trend but rather as representing the strategy of particular companies to meet special conditions.

So far as prices are concerned, one large producer is generally conceded to hold the key, and the policy it has hitherto observed of establishing its prices for a twelve-months' period during the summer is pointed to as a guarantee of stability during the winter.

Dodge Shipments Total 293,842 for 9 Months

DETROIT, Oct. 27.—Dodge Brothers, Inc., reports total shipments in the first nine months of the year as 293,842, a gain of 86,241. Graham Brothers truck and motor coach shipments totaled 29,336, a gain of 12,896. Export shipments from United States and Canadian plants, including Canadian domestic sales, totaled 31,268 as compared with 25,492 in the same period last year.

Changes in Europe Favor Sales Growth

NEW YORK, Oct. 27.—For development of export business to the maximum in Europe, it is essential cars be designed with a view to utmost economy but not at the expense of efficiency, and that the same aggressive merchandising policies employed in this country be put to work there, said George F. Bauer, secretary of the foreign trade committee of the National Automobile Chamber of Commerce. Mr. Bauer has just returned from a three months' trip.

Of conditions in individual countries, Mr. Bauer said:

"In Denmark an effort is being made to eliminate the excessive sales tax which is imposed upon all cars sold, regardless of origin. It is proposed to replace these taxes with a more reasonable gasoline tax.

"Sweden is an excellent export market for this country. An enlightened viewpoint on the general subject of motor transportation prevails.

"Germany also is a good market but is highly competitive," he declared. "The prospect of a reduction in the duty on cars imported into Germany in January also is encouraging.

"There is an expanding market in Switzerland," said Mr. Bauer, "because of the increasing recognition of the utility of the closed car.

States Spend \$649,125,101 on Highways During 1925

WASHINGTON, Oct. 28.—Total expenditures by the State highway departments in 1925 for road and bridge construction on the several State highway systems amounted to \$649,125,101, according to reports from highway departments just compiled by the Bureau of Public Roads, Department of Agriculture. These figures do not include expenditures for county or local roads.

The highway departments received during the year \$664,424,571, with \$115,656,721 carried over from the

previous year, making a total available income of \$780,081,292. Of the amount raised in 1925, 43.5 per cent came from motor vehicle license fees and gasoline taxes (30 per cent from the former and the balance from the latter); 21.3 per cent from the sale of bonds; 13.9 per cent from Federal aid funds; 10.8 per cent from county and other local funds and the balance from special highway taxes and from miscellaneous sources.

Traffic Law Passage Sought in 42 States

DETROIT, Oct. 28.—The proposed uniform traffic code drafted by the Hoover Conference some months ago will be placed before 42 state legislatures in session during the coming winter and a concerted effort will be made to unify the laws of all states, Ernest N. Smith, general manager of the American Automobile Association, declared at the Fifteenth Annual Safety Congress which is in session in Detroit this week.

The following officers have been elected by the automotive section: Chairman, A. F. Dunnebacke, General Motors Corp., Detroit; vice-chairman, A. M. Williams, Chrysler Corp., Detroit; secretary, E. H. Cotcher, Murray Body Corp., Detroit. Executive committee and officers: G. A. Kuenchenmeister, Dominion Forge & Stamping Co., Walkerville, Ont.; R. F. Thalner, Buick Motor Co., L. E. Averill, Packard Motor Car Co., Detroit; R. A. Shaw, Ford Motor Co., Detroit; L. L. Judges, Ford Motor Co. of Canada, Ltd., D. C. Hunter, National Cash Register, Dayton.

Motor Wheel Net \$515,000

LANSING, Oct. 28.—Motor Wheel Corp. and subsidiaries report for quarter ended Sept. 30, 1926, net income of \$515,100 after interest, depreciation and Federal taxes, equivalent after allowing for 8 per cent preferred dividend requirements to 90 cents a share earned on 550,000 shares of no par common stock. This compares with \$417,890, or 72 cents a share in preceding quarter, and \$436,719, or 73 cents a share, in third quarter of previous year. Net income for first nine months of 1926 totaled \$1,511,127, equal to \$2.64 a share on common, against \$1,858,863, or \$3.20 a share, in first nine months of 1925.

Louis Chevrolet Ill

DETROIT, Oct. 27.—Louis Chevrolet is in Ford Hospital here where he underwent an operation for appendicitis after being taken suddenly ill Sunday night. His condition is reported favorable.

See Rubber Changes Helping Inventories

Pegging of Prices Around Present Levels Regarded as Result of Revisions

AKRON, Oct. 28.—While tire manufacturers still are somewhat up in the air as to the future of extension of the Stephenson Restriction Act, the general feeling is that the new plan will be beneficial to the industry as a whole.

Maintenance of the restrictions practically assures that crude rubber prices will not go much lower than 43 cents a pound. Production of rubber is cut 20 per cent if the average price is lower than this figure for any one quarter of the year. On such a basis, indications are that only 80 per cent of production will be allowed in the quarter beginning Nov. 1.

This, it is believed, will help the present inventory situation of many rubber companies, and assures that the low point in tire prices has been reached for several months at least.

The new restriction plan is more elastic, one Akron manufacturer pointed out, in that provision is made for immediate return to standard production on the rubber estates if the average price in a quarter goes above the minimum level, thus preventing the skyrocketing of prices in a panicky market, as was seen last year. After production was once reduced, the former British regulations allowed an increase only at the rate of 10 per cent each quarter. Inelasticity of the restriction act was the chief complaint of American manufacturers in the past.

However, there still will be considerable confusion in the rubber trade until the Colonial office announces definitely its policy on what will constitute the "standard of production" and what will be done about uncanceled coupons for rubber tonnage waiting shipment, according to Akron authorities. In some quarters it is feared that a possible cancelation of these coupons and a cut in production allowed per acre may cause another rubber shortage, regardless of the more favorable restriction policy.

New Provisions of Act

Terms of the Restriction Act as revised now are:

1. If the average price of rubber in London is under 21, but not under 15 pence per pound during any quarter, the exportable percentage of standard productions for the ensuing quarter at the minimum rate of duty will be reduced by 10. If, however, the reduction thus effected is a reduction from the figure of 100 per cent, the reduced percentage for the ensuing quarter will be 80.

2. If the average price of any quarter is not under 21, but less than 24 pence, there will be no change in the ensuing quarter; if, however, in each of the three consecutive quarters the average price is not under 21, then the percentage for the ensuing quarter will be increased by 10.

3. If the average price for any quarter is 24 or over, the percentage will be increased by 10 for the ensuing quarter. If, however, the increase effectable under this regulation is an increase from 80 per cent, the increased percentage for the ensuing quarter will be 100.

4. If the average descends below 15 in any quarter, the percentage in the ensuing quarter will be reduced to 60.

5. If the average exceeds 36 in any quarter, the percentage in the ensuing quarter will be increased to 100.

6. In no case will the percentage be increased above 100 or decreased below 60.

R. S. Cole Succeeds Hutchinson at Hupp

DETROIT, Oct. 27.—O. C. Hutchinson, general sales manager of Hupp Motor Car Corp. for the past 12 years, announced his resignation today. He will be succeeded by Rufus S. Cole, who has been sales promotion manager of the company for the past two years. Mr. Hutchinson will remain with the company in an advisory sales capacity but will devote his time mainly to his private interests.

Mr. Cole joined Hupp in 1915, first serving in the export sales field. He came to the factory three years ago to work in a general sales capacity.

Mr. Hutchinson came into the industry from the bicycle field in 1906, when he joined the Thos. B. Jeffery Co. In February, 1915, he came to Hupp, directing the sales policy of the company. During his incumbency sales increased from 10,000 in 1915 to upwards of 50,000 during 1926.

Court Sets November 24 for Murray Body Sale

DETROIT, Oct. 26.—Federal Judge Simons has set Nov. 24 as the date for sale of the Murray Body Corp. The sale will take place at 10 o'clock in the morning in front of the company's main offices. The corporation has been in the hands of a receiver since Dec. 3, 1925, and the date for the sale was set after the court considered a petition filed by the receivers to show cause why the sale should not take place.

Spicer Profit \$1,498,718

NEW YORK, Oct. 28.—Report of Spicer Mfg. Corp. and subsidiaries for nine months ended Sept. 30, 1926, shows profit of \$1,498,718 after depreciation, interest, etc., but before Federal taxes, compared with \$1,501,887 in first nine months of 1925. Profit for the third quarter totaled \$457,168 after charges but before Federal taxes, comparing with \$520,071 in the preceding quarter and \$535,718 in third quarter of 1925.

Auto Body to Dissolve

LANSING, Oct. 28.—The petition of the board of directors of Auto Body Corp. for a dissolution of the company will be heard in court Dec. 15, at which time stockholders may offer objection to the proceedings.

Business in Brief

Written exclusively for **AUTOMOTIVE INDUSTRIES** by the **Guaranty Trust Co., second largest bank in America.**

NEW YORK, Oct. 28.—Stock prices continued to decline rather sharply last week, while commodity prices in general rose slightly. Trade continued in large volume, although bad weather and low cotton prices restricted the volume of distribution in some sections.

The cotton situation provided another sensation on Monday of this week, when the Government's crop estimate based on condition Oct. 16 was published. The report forecasts a crop of 17,454,000 bales, which is 827,000 bales larger than the previous estimate. The market, however, displayed unexpected strength, closing with small net gains in price. This was attributed in part to the expectation of an increase in the forecast and in part to the absence of panic and the increased demand on the part of manufacturers.

CAR LOADINGS

Car loadings continued practically at the peak during the week ended Oct. 9, with a total of 1,184,862 cars, which is smaller by 662 cars than the figure for the preceding week but exceeds by 78,826 cars the corresponding total last year.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended Oct. 20 were 22 per cent larger than the total for the preceding week (a holiday week) and 4 per cent above that of a year ago.

FISHER'S INDEX

Fisher's index of wholesale commodity prices stood at 148.4 last week, as against 148.1 in the preceding week and 147.8 four weeks earlier. The monthly price index of the Bureau of Labor Statistics advanced last month from 149.2 to 150.5.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve banks declined \$118,200,000 during the week ended Oct. 20, with decreases of \$117,300,000 in discounts and \$1,200,000 in holdings of Government securities slightly offset by an increase of \$1,500,000 in open market purchases. Note circulation declined \$26,500,000 and deposits \$16,700,000, while reserves increased \$9,600,000. The reserve ratio rose from 73.1 to 74.1 per cent.

During the same period, loans of reporting member banks declined \$31,000,000, a decrease of \$98,000,000 in loans secured by stocks and bonds being largely offset by increases of \$1,000,000 in loans secured by Government obligations and \$66,000,000 in "all other" loans. Investments declined \$33,000,000, borrowings from the Federal Reserve banks \$107,000,000 and net demand deposits \$153,000,000.

Harvester Offers Options on Engines

New Speed Line May be Had
With Either Four or Six
in Same Chassis

NEW YORK, Oct. 26—Optional four or six-cylinder engines feature the line of speed trucks recently put into production by the International Harvester Corp. of America. Two capacities, 2500 and 3000 lb. are offered and either the four or six-cylinder engine may be had in either capacity at varying prices. The same chassis units are used with either engine, the engine being installed according to the desire of the buyer.

The new four-cylinder engine is a Lycoming CT with cylinders $3\frac{3}{4}$ x 5, rated at 43.2 h.p. at 2350 r.p.m. The six is a Lycoming ASG $3\frac{1}{2}$ x $4\frac{1}{2}$. Electric starter and lights are standard equipment.

Model S truck of 2500 lb. capacity has been discontinued and the new models S-24 and S-26 replace it. Compared with model S the new truck has 6 in. longer wheelbase. In the 3000 lb. class the new model S34, with four-cylinder engine and S36, with six cylinders, have 160 in. wheelbase.

A banjo type cross member is employed at the rear of the engine and this unit may be removed without removing the transmission.

A reverse Elliott type of front axle is now used and rear axles are of spiral bevel, semi-floating type.

Dodge Brothers' Dealers to Stage Acts at Meeting

DETROIT, Oct. 28—January 5 and 6, 1927, have been chosen by Dodge Brothers, Inc., as the dates for the twelfth annual dealers' meeting. A huge entertainment consisting of some 25 acts by divisional dealer organizations will wind up the conference. Substantial prizes will be awarded.

The country has been divided into four divisions—Eastern, Southern, Central and Western—and representative dealers have been chosen to work out details. The general committee will comprise John R. Lee, chairman; C. S. Henshaw, Boston, Eastern Division; L. J. Hannah, Louisville, Southern Division; L. W. Jordan, St. Paul, Central Division, and Claude Coffing, Sacramento, Western Division.

Take Morrison Jack Name

ALLIANCE, OHIO, Oct. 23—The name of the Woods Engineering Co. was changed to the Morrison Jack Co. at a meeting of stockholders of the company this week. During the past two years the company has confined its activities to the manufacture of the Morrison automobile jack. The name of the company was changed to conform to the product it is manufacturing.

SCHWAB SEES RECORD FOR STEEL IN 1927

WASHINGTON, Oct. 23—Charles M. Schwab, chairman of the board of directors of the Bethlehem Steel Co., painted an optimistic picture of business conditions in a visit to President Coolidge at the White House this week. After his talk with the President, Mr. Schwab predicted that the steel industry would break all past records in the coming year, stating that he looks for production of 50,000,000 tons. "I see no sign of a break," he added.

Another sign indicative of general business conditions noted here this week, was the carriers' report filed with the Interstate Commerce Commission, which stated that Class 1 railroads handled the greatest volume of freight ever offered it in August, and handled it with the greatest expedition ever reported for that month. The average movement of freight cars during August was 31.5 miles, the highest for any August on record.

Ford Offers Colors at Regular Prices

DETROIT, Oct. 25—Two optional color combinations on open cars and three on closed cars are being displayed by the Ford Motor Co. at its Highland Park factory branch. The complete line of cars with the various colors are on exhibition, and local dealers are having similar displays in their salesrooms.

Open cars are shown finished in either gun-metal blue or phoenix brown and closed models are in highland green, fawn gray or royal blue. Prices are unchanged.

It is understood that shipments to Ford branches are now being made.

Cuban Storm Destroys Cars

WASHINGTON, Oct. 26—"A great loss of automobiles throughout the city" is reported to the Department of Commerce, Automotive Division, in a cable from Havana concerning the recent hurricane there. The cable states that Cuban branches of all makes of cars are "hard hit" and that "an immediate demand for automobile supplies exists in Havana as a result of the damages." Public garages are collapsed, according to the cable.

Rule on Reflector Duty

WASHINGTON, Oct. 23—Colored glass light reflectors for automobile head lamps are held dutiable at 55 per cent ad valorem as reflectors, rather than at 60 per cent, the levy on glass illuminating articles, according to a decision of the Customs Court.

Studebaker Scores With Paris Display

Sells 1100 Cars in Opening
Days, Says Hoffman—Erskine Car Well Received

NEW YORK, Oct. 23.—Orders for 1100 cars were booked by the Studebaker Corp. of America during the first six days of the Paris show, according to Paul G. Hoffman, vice-president of the company, who returned to the United States this week.

"I left before the close of the show, said Mr. Hoffman, "but at that time we expected to book more orders than were sold in Europe by the Studebaker Corp. during all of last year. These orders were for immediate delivery.

"My impression of the European automobile situation is that there are better days ahead for motor car dealers in England, France and Germany. The pendulum in European motor car construction seems to have swung from very small light cars to cars offering more comfort and performance. The feature of the show was that 33 French manufacturers exhibited six-cylinder cars.

"American cars have done exceedingly well in Europe when you consider the handicap that has been put upon them. They have a duty of from 35 to 63 per cent to meet and in addition American cars are penalized heavily by having a large tax placed on horsepower. Also, gasoline is very dear in Europe. In England alone it is about 40 cents a gallon, which is about the cheapest rate in Europe.

"The new Erskine six which we introduced at the Paris automobile salon was given an enthusiastic reception. This car will be introduced to America at the New York automobile show in January.

"Mr. Erskine specified, when this car was built, that it would have an American performance with European economy and that is what we have done. This car will give 25 miles to the gallon of gasoline and will take an 11 per cent grade in high speed. The car will sell over here for \$975. In France, with the duty, taxes, etc., the car sells for \$2200 or just 77,000 francs.

"A peculiar situation is that the Erskine six sells for the same price in Paris as the Big Six does in America. We expect to be well into production of the Erskine car at our Detroit plant some time after the first of the year."

Gardner Names Officers

ST. LOUIS, Oct. 25—The directors of Gardner Motor Co., Inc., have elected Thomas Reyburn, secretary; R. E. Lynes, advertising manager, has been made assistant secretary, and W. K. Gardner, was named a director. Mr. Reyburn is a vice-president and director of the Liberty Central Trust Co., St. Louis. Mr. Gardner is vice-president of the St. Louis Coffin Co.

Electric Show Marks Changes During Year

Exhibits Mainly Household Appliances—Four Truck Makers Have Showing

NEW YORK, Oct. 23—At the Nineteenth Annual Electrical Exposition which opened at the Grand Central Palace this week, four manufacturers of electric trucks have a joint exhibit, each maker being represented by a single chassis. The Commercial Truck Co., of Philadelphia, shows a 7½-ton truck chassis with two motors built into the rear axle. O. B. Electric Truck, Inc., of New York, also shows a 7½-ton truck with a single motor mounted on the chassis directly in front of the rear axle, which drives by enclosed chain to a countershaft, whence the drive is taken to the rear wheels by the regular side chains.

The Walker Vehicle Co., of Chicago, exhibits a 1-ton truck chassis with the Walker motor built into the rear axle, and the Ward Motor Vehicle Co., of Mount Vernon, N. Y., shows a 1-ton chassis having a single motor with its axis parallel with the axis of the chassis, which drives to the rear axle by propeller shaft and overhead worm drive. The first three vehicles mentioned have an underslung battery compartment, while in the Ward truck the battery is intended to be mounted on top of the frame.

There have been a number of changes in the electric truck industry during the past year and the industry is noticeably contracting. The Electruck Corp., which was backed by Walter Ward, was taken over by the Commercial Truck Co. some months ago, while the Kelland Motor Co., of Newark, N. J., was taken over by the Walker Vehicle Co. The Autocar Co. abandoned the manufacture of electric trucks in the course of the year.

Two makes of industrial electric trucks are shown by a New York dealer, the Baker-Raulang made in Cleveland, and the Wight-Hibbard made in Phelps, N. Y.

Two Battery Makers Exhibit

Two manufacturers of storage batteries have exhibits at the show, the Electric Storage Battery Co., of Philadelphia and the Edison Storage Battery Co., of Orange, N. J. Electric Storage Battery exhibits its Exide batteries for automobile equipment and other purposes. Edison has never made starting batteries but is supplying batteries for use on motor vehicles not fitted with a starter, including taxicabs, trucks and buses.

The show is gradually changing in character, losing its industrial aspects and becoming more and more a show of electric household appliances. The outstanding feature this year is the large number of electric refrigerators shown.

"BUY A BALE" MOVE STARTED BY DEALERS

SAN ANTONIO, TEX., Oct. 23—A movement started recently in the Austin (Texas) territory by Chevrolet dealers to aid the cotton farmers is expected to spread to all sections of Texas, among Chevrolet dealers, according to C. E. O'Mera of Dallas, district sales manager of the Chevrolet Motor Co.

Chevrolet dealers all over the State are being urged to buy at least one bale of cotton, paying the top price for it, and hold the same until the price of the staple reaches the amount paid for it.

This matter was discussed at a regional meeting of Chevrolet dealers, held at the Gunter Hotel in San Antonio recently, with practically 50 in attendance from various sections of the San Antonio trade territory.

Both local dealers, the Ormsby Chevrolet Co. and the Smith Motor Sales Co., of San Antonio, initiated the movement by each firm buying a bale, paying 20 cents per pound. All Chevrolet dealers were urged to lend the movement their aid.

Small Marmon Price to be Under \$2000

INDIANAPOLIS, Oct. 25—Marmon Motor Car Co. is putting finishing touches on plans for the "Little Marmon," which will be in production by early winter. It is understood that the program contemplates five standard body models which will be on display at the New York and Chicago shows.

It is also planned to add a line of custom bodies, production of which will necessarily follow introduction of the standard line. Prices on the standard models, according to report, will be under \$2000, and production will be in full swing by the middle of winter. Factory capacity has been made available for an output of about 24,000 cars the first year.

Production of the current Marmon line will follow its usual rate. The company is to use Plant 3 for manufacture of the small car. This is a modern five-story factory. The entire car, including bodies, will be built in this structure as a result of the presence there also of the Indianapolis plant of the Murray Body Corp.

Marmon Adopts Fedco

INDIANAPOLIS, Oct. 25—The Marmon Motor Car Co. has adopted the Fedco system of automobile theft prevention and detection. The new model "75" will carry Fedco number plates as standard factory equipment as will all present models.

Car Tax Collections Show Sharp Decline

Effect of 2 Per Cent Reduction Brings September Drop of \$4,662,462

WASHINGTON, Oct. 27—Internal revenue taxes on automobiles and motorcycles collected by the government during September, 1926, amounted to \$7,137,934; a decrease of \$4,662,462 in this classification as compared with September, 1925, according to the monthly tax figures just compiled by the Bureau of Internal Revenue. The decrease is accounted for by the cut to 3 per cent in the tax on automobiles, provided in the 1926 revenue act.

The statement shows that the total taxes collected on automobiles and motorcycles during the three months ended Sept. 30 amounted to \$19,232,883, a decrease of \$15,098,381 as compared with the same three months of 1925, in this classification.

These figures, however, represent only part of the decrease in the tax on the automotive industry, as, in the September figures last year, there appeared a tax of \$1,463,394 on motor trucks and wagons and \$2,669,092 on tires, parts and accessories, both of which taxes were eliminated by the Act of 1926.

The taxes on automobiles and motorcycles during September contributed to an aggregate of \$496,687,585 collected from all sources by the internal revenue bureau during that month, a decrease of \$48,347,131 under September, 1925. While the automobile taxes, therefore, accounted for only about 1.4 per cent of total collections, the decrease in automobile taxes represented a little less than 10 per cent of the total decrease in collections.

G.M.A.C. Opens Offices to Increase Facilities

NEW YORK, Oct. 23—General Motors Acceptance Corp. has leased offices on the fourth floor of the Industrial office building, Newark, N. J., and will open a G.M.A.C. branch there about Nov. 1. J. C. Doremus, formerly manager of the truck division of G.M.A.C., of Detroit, will be in charge. The remainder of the personnel will be drawn from various G.M.A.C. branches.

Opening of the Newark branch is part of an expansion program which has been under way for some time and which accompanies the increase in the sale of General Motors products. Branches are to be opened soon in Flint and Grand Rapids, Mich., and the branch in Miami, Fla., started operation this week. One branch was opened in Tampa, Fla., this month and branches recently were opened in San Antonio and New Orleans.

It is the hope of General Motors that much closer contact with dealers can be maintained through additional branches.

Men of the Industry and What They Are Doing

Anderson is Nominated for Presidency of A.M.A.

Automotive Manufacturers Association has received nominations for officers and directors who are to serve during the year which begins with the meeting set for Dec. 3. The nominating committee submitted but one name for each post to be filled. The nominations are:

President, John W. Anderson, Anderson Mfg. Co., Gary, Ind.; First vice-president, John F. Shuford, Wedler-Shuford Co., St. Louis; second vice-president, C. D. Pettingell, Apco Mfg. Co., Providence, R. I.

Directors: J. A. Anderson, Stone Mfg. Co., Chicago; F. S. Armstrong, Vesta Battery Corp., Chicago; G. F. Disher, Gemco Mfg. Co., Milwaukee; B. J. Koral, E. Edelmann Co., Chicago; Elmer Rich, Simonize Co., Chicago; C. C. Secrist, Victor Mfg. & Gasket Co., Chicago; James C. Shaw, Chicago Solder Co., Chicago; P. C. Thompson, Thompson-Neaylon Co., Chicago. There also are six holdover directors. The formal election will be held Dec. 3 at which time G. F. Disher, now president, will turn over the gavel to his successor.

Pomeroy Takes British Post

L. H. Pomeroy, returning to England after seven years' work in the United States, has been appointed chief engineer to the Associated Daimler Co., the merger that recently took in the Daimler Co. and the Associated Equipment Co., makers of trucks and buses. Mr. Pomeroy will also act as consultant for the London General Omnibus Co.

Masters Named Vice-President

Frank A. Masters, representative of Garford Truck Co. in foreign territory, has been made a vice-president of the company. He is leaving for Buenos Aires where he will have charge of the Garford exhibit at the Argentine automobile show. He will also establish dealer connections while in South America.

Rouze Resigns G. M. Truck Post

C. F. Rouze has resigned as district sales manager of General Motors Truck Co. in the Kansas City territory. Formerly he was assistant sales manager and sales promotion manager at the factory in Pontiac. Mr. Rouze has not announced his future plans.

Cobham to Visit U. S.

Sir Allan Cobham, who is said to have flown half a million miles by airplane, will visit the United States early in November, according to London dispatches. He will lecture on the national and international possibilities of new types of planes and motors.

TREE EXPERT NAMED FOR FIRESTONE WORK

Walter H. Bangham, a graduate of the School of Agriculture of the Ohio State University, has accepted a position with the Firestone Tire & Rubber Co., of Akron, to supervise the planting of rubber trees on the large rubber plantation which is being started in Liberia. He will leave soon for a stay of a year and a half in that country.

Commerce Chief Resigns to Take Studebaker Post

William Althoff, Chief of the Industrial Machinery Division of the Bureau of Foreign and Domestic Commerce, has resigned that position to become special representative of the Studebaker Corp. for Mexico and Cuba, supervising the factory's dealer-agents in these countries, it has been announced by the Department.

Prior to his connection with the Department, Mr. Althoff was for 10 years engaged as an automobile sales executive for various American concerns.

Young Heads Department

Major Clarence M. Young, of Des Moines, has been appointed chief of air regulations and inspections of the Department of Commerce, by W. P. McCracken, Jr., Assistant Secretary of Commerce for Aeronautics. Major Young is a Yale graduate, reserve officer in the Army Air Corps.

Kidder Back in Boston

Edward H. Kidder, who resigned recently as vice-president of the Dunlop Tire Co., Buffalo, is back in Boston in charge of the New England branch of the Ajax Tire Co. Mr. Kidder lived here for many years when he was New England branch manager of the United States Tire Co. previous to going to Buffalo.

Gardner Names Sales Heads

Gardner Motor Co., Inc., has appointed H. Shelton, formerly with Chevrolet Motor Co. and Durant Motors, Inc., district sales manager for Ohio and northern Indiana. Peyton C. Hough, formerly connected with distributors in Denver and Salt Lake City, has been placed in charge of the western district.

Thompson on European Trip

Charles E. Thompson, president of Thompson Products, Inc., is in Europe visiting European automobile exhibitions as well as aeronautic and automobile engine builders.

Cleveland Boosters Club Elects Officers for Year

The Automobile Boosters' Club, Cleveland, held its annual business meeting and election of officers at the Winton Hotel this week. There was an unusually large number of automotive accessory and equipment manufacturers' representatives present.

Officers were elected as follows: W. E. Washburn, Jr., representing the Raybestos Co., president; J. F. Werder, Zipp Abrasive Co., vice-president; C. R. Stanley, Wolverine Bumper Co., secretary; Archie Jordan, U. S. Air Compressor Co., treasurer.

The new directors are composed of the above mentioned officers and C. M. Hall, manager of the Cleveland office for Black & Decker Mfg. Co.; R. S. Staples, W. H. Thomas Mfg. Co.; Ira Saks, Pennsylvania Piston Ring Co.; L. E. Christopher, Buckeye Brass & Mfg. Co.; Russell Wendell, U. S. Chain & Forging Co.; K. S. Clapp, U. S. Air Compressor Co., and R. M. Williams, manufacturers' agent of this city.

J. M. LaVaque Resigns

J. M. LaVaque, vice-president and treasurer of the National Gauge & Equipment Co., recently merged with the Moto Meter Co., has resigned and will take a long rest before re-engaging in active business. Mr. LaVaque became associated with the industry in 1914 when he assisted in the reorganization of the Hans Motor Equipment Co., out of which the National Gauge & Equipment Co. was developed.

Swayne Aids Red Cross

A. H. Swayne, vice-president of General Motors Corp., heads the special automobile section in the annual Red Cross enrollment drive in New York. Other men on this section are Henry Ittleson, president of Commercial Investment Trust Co., Ben Asch of Asch & Co., and J. C. Weston, president of Ajax Rubber Co.

Brown on A. E. A. Staff

Elmer W. Brown has been appointed special merchandising representative of the Automotive Equipment Association in charge of Zone 3 which includes Ohio, West Virginia, the northern part of Pennsylvania and the provinces of Ontario and Quebec. For the past four years he has handled sales in the Midwest for the McCord Radiator & Mfg. Co.

Betsch Turns Distributor

W. C. Betsch has resigned as New York factory representative of Budd Wheel Co. to take over the distribution in New York territory of the Hartford steering damper and other Hartford products.

Fisher Body Brings GMC Earnings High

Quarter Income \$66,890,784
and Nine Months Total
is \$149,317,553

NEW YORK, Oct. 27.—Earnings of the General Motors Corp. for the nine months ended Sept. 30, including the corporation's equity in subsidiary companies, totaled \$149,317,553 as against \$80,921,018 for the corresponding period last year. Earnings in the third quarter were \$66,890,784, this including for the first time all earnings of Fisher Body Corp., as compared with \$28,161,730 in the third quarter of 1925. Earnings in the full year 1925 were \$106,484,756. As of June 30, General Motors purchased all assets of the Fisher corporation in which it formerly held 60 per cent of the stock.

Nine months' earnings are equivalent to \$17.77 a share on common stock as against \$9.71 a share for the same period of 1925 after allowance for the difference in number of shares outstanding.

The balance sheet as of Sept. 30, 1926, shows cash and marketable securities of \$169,223,579.

Warner and Fokker Talk at Metropolitan Meeting

NEW YORK, Oct. 23.—E. P. Warner, assistant secretary of the navy, and A. G. Fokker, vice-president of the Atlantic Aircraft Corp., were the principal speakers at the aviation meeting of the Metropolitan Section of the Society of Automotive Engineers held at the Hotel Woodstock, this week.

Secretary Warner, in discussing naval aviation in its relation to commercial aviation, stressed the dissimilarity in the type of service required for these two purposes in the design of the planes, but declared that this divergence was not so great in the case of the motors.

It is now possible, he declared, to calculate accurately what it costs to carry an extra increment of weight in an airplane and to establish the ratio of this factor to the first cost. It is safe to say that it is worth \$1500 more in a motor if we can save 100 lb. in its weight, which is equivalent to \$15 for every pound saved. In military or naval planes, it probably is worth \$25 a pound, he said. This indicates the value of refinements in design and selection of materials for the power plant. If in commercial aviation the plane is to be continuously operated, it is essential that the utmost refinements be incorporated in the design.

Mr. Fokker discussed the latest and future developments in commercial aviation. He declared that speed, safety and comfort are now available in commercial airplanes. In contrast to earlier designs, the modern ship now

has a life of about 2000 hours, during which no major repairs must be made. Safety, he said, is a matter of ground organization and adequate weather reports. He indicated that the government service in this respect leaves much to be desired now.

Other speakers were: Arthur Nutt of the Curtiss Aeroplane & Motor Co., Inc.; George Meade of the Pratt & Whitney Aircraft Co.; C. S. "Casey" Jones, civilian aviator and Lieut.-Col. B. D. Foulois, commanding officer of Mitchell Field.

Flexibility Big Asset of Smaller Factories

ELKHART, IND., Oct. 26.—F. B. Sears, president of Elcar Motor Co., addressing a meeting of Elcar distributors, described convincingly the future for the smaller automobile manufacturer. It is his firm belief that there will always be a place in the sun for the manufacturer whose output is relatively modest in quantity. He said:

"The flexibility of the smaller manufacturer's facilities makes it possible for him to individualize his car to a far greater extent than is possible to the quantity production car. He can supply special body jobs in distinctive color schemes without in any way disturbing his machinery of production. And he can do this without being forced to demand an exceptionally high price for his product, because his capital investment, his inventory and his overhead in general is in proportion to his output.

"I have no fears for the future of the small car manufacturer if he realizes his limitations and makes the most of his possibilities."

Inland to Expand Plant

DAYTON, Oct. 26.—Plans for the erection of a new building to cost \$250,000 including plant and equipment, were announced today by W. S. Whittaker, president of the Inland Mfg. Co., a subsidiary of General Motors Corp. The building will be given over to the manufacture of hard and soft rubber and other molded products used in the automotive field and in the production of Frigidaires.

Buick Adds New Coupe

FLINT, Oct. 27.—Buick Motor Co. is adding a convertible coupe on the series 128 chassis, which will list at \$1925. The body is finished in duotone Winchester blue Duco and upholstery is hand-buffed leather. A low hung dickey seat is carried in the rear deck.

F. R. Fageol Resigns

NEW YORK, Oct. 27.—F. R. Fageol has resigned as vice-president and as a director of American Car & Foundry Motors Co. No successor is to be appointed, according to C. S. Sale, president.

Bus Owners Ask Ranking as Utility

Propose State Control With
Federal Appeal Right at
Final I.C.C. Hearing

WASHINGTON, Oct. 27.—The case of motor bus owners of America, in the discussion of Federal regulation of bus transportation as distinct from rail transportation, was presented in a detailed statement, summed up by definite recommendations in the form of a proposed bill, by S. A. Markel, chairman of the legislative committee of the Motor Bus Division, American Automobile Association, to the Interstate Commerce Commission's examiners at the opening of concluding sessions in the hearings on the bus regulation problem.

Mr. Markel's presentation was the motor bus owners' reply to the railroads—a plea for Federal recognition of motor bus transportation as a utility in itself, and "not an illegitimate or step-child of the science of transportation."

The main traffic now carried by the motor bus, Mr. Markel said the motor bus owners have proved conclusively, "is either traffic that the railroads never carried or traffic which had been lost by the rails to privately owned passenger cars and regained by the buses because of similarity of accommodation." Adding a train or two to a railroad schedule does not meet the public need supplied by buses, Mr. Markel said.

The main points in the proposed bill which Mr. Markel singled out for explanation before the examiners follow:

1. That it affects only motor buses "as the enforceable regulation of the motor truck makes the wisdom of including the bus and truck in one regulatory law questionable."
2. That, as in the case in the Cummins-Parker bill, the motor bus owners recommend that regulation shall be exercised by State agencies, except where there is dispute, when an appeal shall be made to the Interstate Commerce Commission.
3. Concerning consideration to be given existing transportation service when there is a hearing on an application from a motor bus carrier, the bill provides that consideration shall be given, primarily, to public necessity and convenience.
4. In the matter of regulating rates, fares and charges, the words "unduly discriminatory," which appeared in the Cummins bill, are eliminated, because, Mr. Markel explained, "we feel that their inclusion might be construed to mean that the bus rates were discriminatory as compared with rail rates."

Schmitt Leaves Chrysler

DETROIT, Oct. 27.—The resignation of W. J. Schmitt as comptroller of the Chrysler Corp. was made known today. He will devote his time to the affairs of Zeder, Skelton & Breer Engineering Co., Inc., of which he has been secretary and treasurer.

Steel Backlog Holds New Purchasing Low

Industry Blamed for Much of Present Recession—Ship- ment Rate Steady

NEW YORK, Oct. 28—Further recession in the general industrial demand is accompanied by a somewhat overdrawn picture of the automotive industries' part in this perfectly normal reaction. It's the old story of the automotive industries being the convenient peg on which to hang all of the steel industry's troubles when the first cloud appears on the firmament.

While there is a lack of fresh automotive commitments, specifying against standing contracts continues at a very fair rate, and, inasmuch as the sheet mills reported on Oct. 1 an unfilled tonnage of 731,977 tons, about two-and-a-half times their September production, it will be readily seen that their backlog of business is considerable, and that a quarter to one-third of this is for automotive account is a conservative estimate.

There has been virtually no buying at the higher prices, and it is possible that automotive consumers will be able to get along on what steel is due them at old prices until diminished demand is more adequately reflected in the price situation which remains unchanged. There are unverified rumors of concessions even at this early date when most mills still have a very comfortable order reserve to work on.

Non-integrated rollers of full-finished automobile sheets continue to work at a normal rate. Competition among cold-finishers of steel bars and among strip steel producers is keen. Prices have not altered, but they are perhaps a bit more on the defensive than they were a month ago.

Pig Iron—Conditions in the fuel markets where heavy export demand for bituminous coal has brought about an overnight change to sharply advancing prices, are reflected in the stronger tone of pig iron. With coke prices on the uptrend, blast furnace interests are less eager to commit themselves at prevailing pig iron prices. Automotive demand, however, as is that of foundries in general, is light, and easily met by single car shipments.

Aluminum—The trade read with considerable interest that part of Secretary Mellon's statement of Monday in which he points out that the sole domestic producer of aluminum would not be the loser if the tariff on aluminum were lowered, because in that event the company's foreign plants would be enlarged, and production in those at home curtailed. This is the first frank statement characterizing the world's leading aluminum enterprise as international rather than American. Automotive consumers of aluminum have long since recognized that international price agreements have far more of a bearing than the tariff on the price they pay for the metal, and, therefore, the advent of the Continental aluminum cartel is looked upon

as a major market development. Prices remain pegged at the old levels.

Copper—Consumers show little interest, and the market continues quiet.

Tin—Moderate recessions followed the abnormally high course of the market. Prices are still too high to warrant purchasing on a larger scale than for immediate needs.

Lead—Storage battery manufacturers have bought heavily, their orders covering several months' needs at average contract prices.

Southern Hardwoods Show Buying Gains

ATLANTA, Oct. 23.—Lumber manufacturers and wholesalers in the Atlanta lumber market state that there has been a marked impetus in the demand for southern hardwoods the past two or three weeks from the automobile and body trades in the East and Middle West, and that sales at present have reached the largest volume in the past several months—the best, in fact, since the unusually good business enjoyed during the spring months when the manufacturers were preparing for their summer productive activity.

The principal call is for the thicker dimensions of white ash in the best grades, with some call also reported for No. 1 and select ash, a secondary grade, and for the best grades of maple and elm. Furthermore, it is interesting to note that some of the larger makers are anticipating their needs again some weeks ahead and placing their orders accordingly, a practice which has not been in vogue for some three or four months. The outlook gives promise of continued active sales through the Fall months.

Prices are comparatively unchanged, having held to about the same average levels now for almost a year. Mills are producing on a good scale and have fairly sizeable stocks of ash, maple and elm on hand.

Deppe Patent Claim Upheld

NEW YORK, Oct. 23.—A decision has been handed down by Federal Judge Runyon in United States District Court in Newark, N. J., upholding the claims of William P. Deppe and the Deppe Motors Corp. against General Motors Corp., in which Deppe alleges infringement of two patents covering processes and apparatus for carburetion. The specific infringements alleged are on the 1922 model Buick car and G.M.C. truck.

Indications are that considerable further litigation will follow.

Dodge Exports Gain 22.7%

DETROIT, Oct. 23.—During the first nine months of 1926 a total of 31,268 Dodge Brothers cars and trucks were exported. The shipments represent units sent from its plants in the United States and Canada and also includes sales to dealers in the Dominion. The business represents a gain of 22.7 per cent over the same period, last year, when the total was 25,492 cars.

Rubber Protest Cuts Use by 34,271 Tons

Efficacy of Conservation As Defense Against Output Control Shown by Holt

WASHINGTON, Oct. 26—America's use of conservation as a defense against foreign rubber control and "gouging" by foreign interests, "is well demonstrated not alone by amelioration in price but by actual reduction in the consumption of rubber for the fiscal year," Everett G. Holt, chief of the Rubber Division, Department of Commerce, declares in a review of this country's fight against the British rubber "gouge" last year.

In his review, soon to be published as part of a Department of Commerce report on its investigation into the rubber situation as it is affected by foreign control, Mr. Holt declares that the result of the conservation campaign was "to break spot prices of rubber from the average of 104.8 cents for November, 1925, to an average of 59 cents in March, 1926, and 40.2 cents from June to September, inclusive." During the fiscal year, Mr. Holt finds American rubber imports cost \$603,000,000, or \$270,000,000 in excess of the "fair price" of the Stevenson Act enforced by Great Britain to control production of rubber, but Mr. Holt adds that "by the effective results of conservation we avoided far larger penalties."

To the National Automobile Chamber of Commerce, the Rubber Association of America and the American Automobile Association, the Holt report gives credit for much of the success of the conservation campaign.

On the decrease in consumption in rubber as a result of the conservation campaign, Mr. Holt finds that during the fiscal year 1924-25 the consumption of imported rubber was about 375,832 tons. With the increased number of automobiles for the fiscal year 1925-26, he figures America should have absorbed 401,000 tons. The actual amount taken into rubber manufacturing processes, however, was only 366,892 tons during the fiscal year 1925-26, or a decrease from the estimated normal of 34,271 tons.

Stocks Represent 25,660 Tons

In addition to this, the stocks of casings in the country increased during the year by more than 4,700,000 and that of inner tubes by 9,800,000, representing an effective addition to stocks of 25,660 tons of rubber. Mr. Holt figures an additional 17,000 tons of rubber required for original tire equipment purposes, because of increased production of automobiles. These savings he attributes almost entirely to the conservation campaign which came as a result of the sky-rocketing of British rubber prices.

Exports, Imports and Reimports of the Automotive Industry for September of Current Year and Total for Nine Months Ending September, 1926

	Month of September		1926		Nine Months Ending September		1926	
	Number	Value	Number	Value	Number	Value	Number	Value
EXPORTS								
Automobiles, parts and accessories (total)	8	\$25,964,975	6	\$26,776,104	92	\$234,702,618	63	\$245,778,472
Electric trucks and passenger cars		5,058		8,923		144,084		103,509
Motor trucks and buses, except electric:								
Up to 1 ton, inclusive								
Value up to \$800, inclusive	2,611	1,042,053	5,287	2,318,043	27,723	10,021,007	38,715	16,689,772
Value over \$800	302	277,398	206	223,512	2,288	2,427,728	2,013	2,331,904
Over 1 and up to 2 1/2 tons	978	1,199,335	1,243	1,515,424	7,144	8,988,634	9,137	12,002,119
Over 2 1/2 tons	143	457,721	227	614,726	1,191	3,611,958	1,703	5,235,582
Total motor trucks and buses, except electric	4,034	2,976,507	6,963	4,671,705	38,346	25,049,327	51,568	36,259,377
PASSENGER CARS								
Passenger cars, except electric:								
Value up to \$500, inclusive	7,023	2,615,840	8,228	3,268,786	73,132	26,829,040	73,043	27,959,948
Value over \$500 up to \$800	5,156	3,725,843	5,800	4,076,658	45,247	32,049,255	51,406	36,086,892
Value over \$800 up to \$1,200	4,935	5,229,943	4,599	4,831,083	42,436	44,488,451	42,205	44,452,327
Value over \$1,200 up to \$2,000	1,220	1,838,354	905	1,393,211	15,290	22,807,042	8,858	13,576,300
Value over \$2,000	446	1,203,177	506	1,382,726	3,931	10,716,953	4,167	11,357,640
Total passenger cars, except electric	18,780	14,613,157	20,038	14,952,464	180,036	136,890,741	179,679	132,433,107
PARTS, ETC.								
Parts, except engines and tires,								
Automobile unit assemblies		3,911,804		2,351,141		32,175,311		31,909,191
Automobile parts for replacement		2,349,037		3,177,107		21,060,477		27,029,071
Automobile accessories		707,090		742,467		6,405,537		7,305,231
Automobile service appliances (n. e. s.)		596,042		653,820		3,940,100		5,493,537
Station and warehouse motor trucks	4	8,412	8	10,671	215	162,955	124	131,959
Trailers	49	12,394	78	22,019	421	195,281	784	277,319
Airplanes	6	33,500	2	9,083	69	329,876	32	149,204
Parts of airplanes, except engines and tires		1,624		5,164		97,308		116,950
BICYCLES, ETC.								
Bicycles and tricycles	552	14,413	357	9,201	5,907	156,126	4,123	121,117
Motor cycles	1,479	327,913	1,633	362,544	16,309	3,684,211	17,501	3,792,011
Parts, except tires		150,999		97,337		1,271,777		1,358,049
INTERNAL COMBUSTION ENGINES								
Stationary and portable:								
Diesel and Semi-Diesel	43	92,174	98	102,571	705	437,789	668	1,226,590
Other stationary and portable:								
Not over 10 HP.	2,496	212,075	3,886	347,984	21,452	1,852,988	25,774	2,517,039
Over 10 HP.	201	126,649	557	263,298	2,019	1,707,207	2,301	2,045,674
Automobile engines for:								
Motor trucks and buses	5,906	522,588	526	61,212	37,407	3,182,681	5,254	621,409
Passenger cars	6,520	879,734	5,752	811,085	87,788	9,794,460	100,560	10,117,577
Tractors	206	104,548	409	217,785	1,153	497,126	1,727	954,791
Aircraft	21	46,150	12	5,656	53	128,449	289	567,859
Accessories		357,632		327,038		3,140,072		3,334,677
Automobiles and chassis (dutiable)	67	89,858	87	157,609	466	204,897	548	986,718
Other vehicles and parts for them (dutiable)		32,509		21,459		556,864		116,547
REIMPORTS								
Automobiles (free from duty)	15	16,318	24	29,519	157	220,661	134	199,667

Equipment Exhibits Set for Many Cities

PHILADELPHIA, Oct. 28.—Through the activity of manufacturers of shop equipment and their jobbers, working exhibits of this equipment will be staged as part of the automobile shows in many if not all leading cities. By displaying the efficiency of this equipment to car owners visiting shows, it is expected to bring a demand for modern servicing which will require the placing of practically all service stations on a modernly equipped basis.

The exhibits in the local shows will supplement the exhibits at the national shows in New York and Chicago.

It is understood that displays are assured in virtually all the following cities: Philadelphia, Baltimore, Detroit, Cleveland, Cincinnati, Milwaukee and Pittsburgh. Among other large cities that will probably adopt the plan are Los Angeles, San Francisco and Kansas City.

The local groups of jobbers are arranging for the displays. They will rent the exhibition space and supply and install exhibits. The manufacturers will assign factory representatives as demonstrators and supply direct mail and other promotional material.

Among the service equipment men who are actively interested in the movement are: R. W. Procter, Black & Decker Mfg. Co.; Fred G. Wacker,

Automotive Maintenance Machinery Co.; Martin Goldman, General Equipment Co.; H. M. Smith, Manley Mfg. Co.; George W. Fleming, Fleming Machine Co., and C. F. Hodgson, Weaver Mfg. Co.

G.M. Traffic Managers Visit Dayton Factories

DAYTON, Oct. 22.—Thirty traffic managers from plants of the General Motors Corp. held a two-day professional session at the Miami Hotel here this week, with Alfred H. Swayne, of New York, vice-president of corporation, presiding. This is one of the regular quarterly sessions held in different cities during the year.

Wednesday's meetings were devoted entirely to business. The visitors inspected the Frigidaire, Delco-Remy, Delco Light and Inland factories Thursday.

"The business outlook is healthy and good," Mr. Swayne said. "Money is comfortable and credit is not strained. I can see no reason why the present situation should not continue."

Junkers Builds Big Plane

PHILADELPHIA, Oct. 23.—Junkers Company in Germany is building a 100-passenger four-motored air liner to be used on lines which cross large bodies of water. The exact use to which this ship is to be put is not at present known, although it is rumored that it might be a Trans-Atlantic flight.

See \$40,000,000 Gain in British Market

LONDON, Oct. 25.—Sales of automobiles in England increased 20 per cent since November, 1925, statistics soon to be disclosed by the Motor Car Manufacturers' Association are expected to show. The value of this volume of business will approximate \$260,000,000, of which nearly 50 per cent went to cars of American manufacture. During the coming year the volume of business is expected to exceed \$300,000,000.

Thirty per cent of the sales in Great Britain are to women buyers said H. K. Preston, sales executive of one of the leading British producers. This should be borne in mind by manufacturers building for the British market, he said. At the present time, he said, one Englishman in 30 is a car owner but this ratio will be increased by 50 per cent soon.

A larger demand for American cars is anticipated with the replacement of the present horsepower tax by a gasoline tax. The addition of 2200 miles of new arterial roads under last year's road program has accelerated sales.

Republic Opens Branch

PITTSBURGH, Oct. 28.—A direct factory branch has been opened here by the Republic Motor Truck Co. A. A. Blattner is branch manager.

Lease Light Sites on Air Mail Lines

Commerce Department Also Will Locate Landing Fields at 30 Mile Intervals

WASHINGTON, Oct. 27.—W. P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics, has announced that his department has completed the survey of approximately 1200 miles of airways; has leased sites for lights at intervals of 10 miles along these routes and has acquired rights to landing fields at approximate 30-mile intervals. The surveyed 1200 miles represent portions of contracted air mail routes which require night flying. Eventually, Mr. MacCracken states, the unlighted sections will be equipped, and night flying will be possible over the entire distance.

The following are the routes on which lighting is being installed, with the approximate number of miles lighted: New York to Boston, 185 miles; St. Louis to Chicago, 277 miles; Dallas to Chicago, 345 miles; Los Angeles to Salt Lake City, 140 miles; Pasco to Elko, 100 miles; Twin City to Chicago, 80 miles, and Cheyenne to Pueblo, 160 miles. It is expected that current will be turned on a substantial mileage of the airways before the end of this year.

Air Rules Soon Effective

WASHINGTON, Oct. 27.—Tentative regulations for the control of commercial and other aviation in America, which will be put into effect about the middle of November, when all commercial flying will come under the supervision of the Federal government, have been informally announced by officials of the Department of Commerce.

The regulations were adopted tentatively after a series of conferences arranged by Secretary of Commerce Hoover. They cover all phases of aeronautics, from the inspection of planes in construction, maintenance of landing fields and qualifications of pilots, to air traffic laws.

Among those taking part at the final conference were: A. F. Denham of Automotive Industries, C. Caldwell of Aero Digest, B. E. Garber of the Smithsonian Institute, Commander R. D. Kirkpatrick of the United States Navy and Ira Grimshaw of the Chamber of Commerce.

Fix Assembled Car Status

WASHINGTON, Oct. 23.—In a letter to the Collector of Customs at Tampa, Fla., L. C. Andrews, assistant secretary of the treasury in charge of customs, had laid down an opinion that automobiles assembled abroad from parts of American manufacture should be treated as manufactured in the country in which assembled, for the purpose of determining the rate of duty under

the Tariff Act; but that complete automobiles exported from the United States in a "semi-knocked down" condition merely for convenience in shipping, should be regarded as of American manufacture.

The letter lists the plants in which complete assembly operations or partial fabrications are conducted abroad by American manufacturers, and those in which the "semi-knocked down" cars are set up.

Value of Chromium Outlined by Dr. Fink

DETROIT, Oct. 23.—Addressing the Detroit section of the Society of Automotive Engineers this week, on "Chromium—A Metal of Many Uses," Dr. Colin G. Fink of Columbia University, said this metal had not come into more general use because its possibilities had not been given sufficient study.

As to the effect of chromium plating on aluminum cylinders for aero engines, Dr. Fink said its efficiency as a wearing surface would be defeated by the lack of rigidity of the aluminum base. In the chromium plating of any wearing parts, he said, it is necessary that the pieces to be plated have practically the same degree of hardness as the plating, as otherwise the stresses on the plating would crowd away the metal underneath.

The cost of chromium plating, he said, compares favorably with nickel plating, the principles and apparatus being practically alike. The thickness of the plating can be varied in the same degree as other methods of plating, the most practical thickness of chromium for all general purposes being .0002 in.

Supreme Court Upholds States in Chrysler Suit

WASHINGTON, Oct. 27.—The Chrysler Insurance Plan, attacked in several States and carried to the Supreme Court of the United States on the contention of various States of their right to exact insurance licenses and levy insurance taxes in individual States as a result of the fire and theft policies sold with Chrysler cars, has been given an adverse decision by the Supreme Court.

In an opinion rendered by Justice Holmes for the Court, in the cases of Ohio, Maine and Wisconsin concerning the Chrysler plan, it is held that the Chrysler plan "causes contracts for insurance to be made within the State of retail sale, and such insurance is subject to tax by the States."

Tool Company to Build

DAYTON, Oct. 23.—Officials of the International Tool Co., manufacturers of dies, jigs, fixtures and gages, announced today that the company is planning the erection of a new factory building on a three-acre tract purchased recently. The new building is to cost around \$250,000.

Financial Notes

Briggs Mfg. Co. reports for quarter ended Sept. 30, 1926, net profit of \$1,359,068 after depreciation, Federal taxes and other charges, equivalent to 67 cents a share earned on outstanding 2,003,225 shares of no par common stock. This compares with \$2,466,388, or \$1.23 a share, on 2,000,000 shares in the preceding quarter and \$1,025,485, or 51 cents a share in the third quarter of 1925. Net profit for the first nine months of 1926 totaled \$6,772,799 after above charges, equal to \$3.38 a share, compared with \$5,092,750, or \$2.54 a share, in first nine months of previous year.

Chrysler Corp. and subsidiaries for nine months ended Sept. 30, 1926, report net profits of \$11,719,812, after all charges and Federal taxes, equivalent, after preferred dividends, to \$3.85 a share earned on 2,707,080 shares of no-par common stock. This compares with profit of \$16,275,286, after charges but before Federal taxes, in the first nine months of 1925. For the September quarter this year, net profit was \$3,873,068 after all charges and Federal taxes, equal to \$1.27 a share on the common.

American Bosch Magneto Corp. for the nine months ended Sept. 30 reports profit of \$244,143 after expenses and depreciation but before Federal taxes, equivalent to \$1.17 a share earned on 207,399 shares of no par stock. This compares with \$305,483, or \$2.20 a share, on 138,266 shares outstanding in the same period of 1925.

Borg & Beck Co. reports for nine months ended Sept. 30, 1926, net profits of \$631,000 after charges and Federal taxes, equivalent to \$5.04 a share (par \$10) earned on outstanding 125,000 shares of stock, compared with \$420,000, or \$3.95 a share, on same share basis in first nine months of 1925.

Yellow Truck & Coach Mfg. Co. and subsidiaries, shows net profit of \$163,946 for the quarter ended Sept. 30, 1926, as against \$385,457 in the same quarter last year. For the nine months earnings were \$1,679,176 as against \$1,592,173 for the same period in 1925.

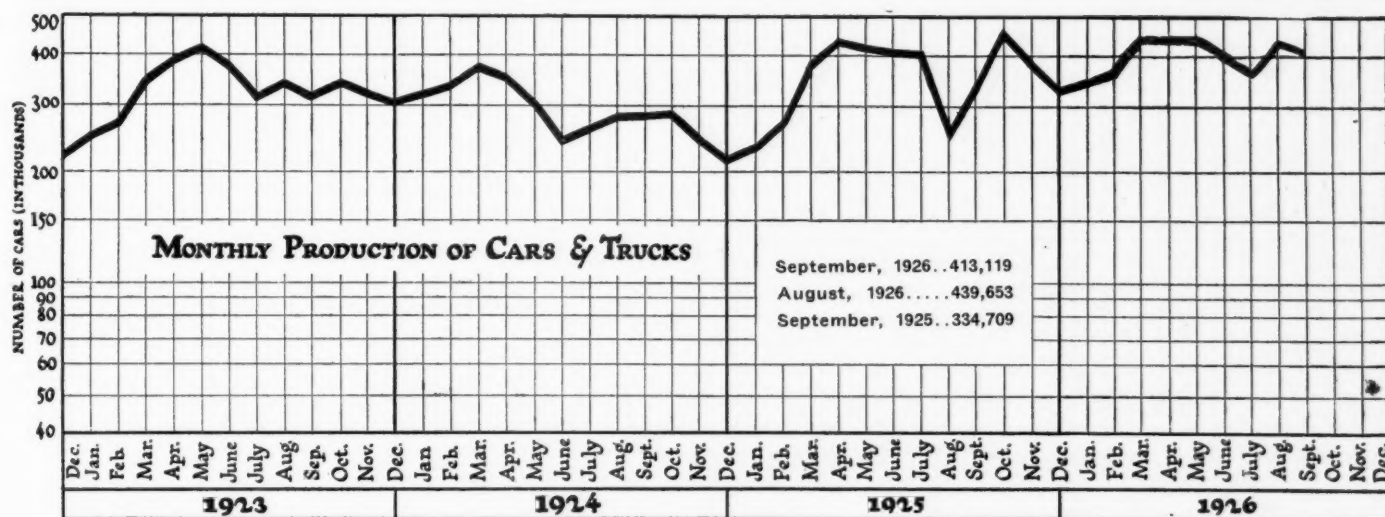
The Cutler-Hammer Mfg. Co., Milwaukee, a large manufacturer of electric controlling devices, switches, etc., has increased its capitalization from \$4,000,000 to \$6,000,000. Of this \$2,000,000 is common stock and \$4,000,000 preferred shares.

Electric Auto-Lite Co. reports net income before Federal taxes for the quarter ended Sept. 30, 1926, as \$640,636 and for the nine months, \$1,842,513. Income in the June quarter was \$530,658. Net income for the full year 1925 was \$2,204,434.

Evans (E. S.) Co., Inc., shows net income of \$165,450 for the quarter ended Sept. 30, 1926, and for the nine months, \$430,152. Earnings in the nine months of 1925 were \$350,349.

Duesenberg, Inc., has been chartered in Delaware with a capital consisting of 75,000 shares of no par class A stock and 150,000 shares of no par class B stock.

September Output Shows Normal Drop



Matheson Sees West Holding Prosperity

PONTIAC, Oct. 23.—C. W. Matheson, vice-president and director of sales of the Oakland Motor Car Co., just back from a seven weeks' business trip through the West, reports that conditions are excellent. "I got this idea not only from dealers and executives of our own selling organization, but likewise from bankers, financing organizations and Boards of Commerce in the communities I visited," he declared.

"The growth of good roads has been tremendous since I last visited the Pacific coast, and this, together with the preponderant choice for closed cars has materially flattened out the peaks in the selling seasons that were previously so noticeable in the motor car industry.

"There is every evidence of quickened business in all of California," Mr. Matheson said. "The weather has been good and consequently the crops are not only good but enormous. In Arizona, Nevada, Utah and Montana, the mining industry is prospering and in the Northwest States of Washington and Oregon, the lumber industry seems to be back again. In Iowa not only are the crops good but the increase in the number of improved roads is large. In the majority of places I stopped, I had to wire in for more cars for our dealers."

Used Car Sales Increase

CLEVELAND, Oct. 23.—That the Cleveland automobile dealer is solving the used car problem and keeping them moving is indicated by figures of the Cleveland Automobile Manufacturers' & Dealers' Association which show that for the first nine months of this year there were 104,310 used cars sold in Cuyahoga county as against 70,989 for the same period last year. This is an increase of 46 per cent. During the

same period there were 32,248 new cars sold as against 28,846 for the same period in 1925 this being an increase of 12 per cent. Used cars sales increased every month in 1926 except in September. New cars sales increased every month during 1926 except during July and August.

Propose Bois de Boulogne at Grand Prix Course

PARIS, Oct. 15 (by mail)—European racing rules for next season will provide for supercharged engines having a piston displacement of 91½ in., a minimum weight of 1543 lb. and a minimum width of 31 in. In all probability the provision of two seats side by side will not be enforced. There is a proposal to hold the French Grand Prix, the most important race under these rules, in the Bois de Boulogne, at Paris. The Bois is a city park, within four miles of the city hall, possessing excellent roads which could be used for racing. It is understood that the city authorities are favorably disposed to the use of these roads for a big international race.

In addition to the 91½ in. Grand Prix, the French club will hold a second race, next year, under a fuel allowance of 18 litres of gasoline and oil, per hundred kilometres. This is equivalent to rather more than 13 miles to the American gallon.

Overland Takes Sizaïre License

PARIS, Oct. 15 (by mail)—Willys-Overland Co. has taken out a non-exclusive license for the use of patents covering the Sizaïre Freres suspension, according to a statement made here by Maurice Sizaïre, engineer of this concern. The Sizaïre system comprises independent springing of the four wheels by means of transverse springs and has combined with it a special braking and steering system. The present Sizaïre car has been on the market about four years.

Bugatti Demonstrates New High-Priced 8

PARIS, Oct. 15 (by mail)—Ettore Bugatti this week demonstrated to a small number of friends the first model of his luxurious straight-eight automobile which, with a piston displacement of 898 cu. in. and a wheelbase of 185 in., is the biggest passenger car in the world. Listed at 500,000 francs (\$14,285) for chassis only, it is the most expensive car built.

In full running order, with a seven-passenger phaeton body the Bugatti weighs 5700 lb., of which 770 lb. is represented by the engine. The car has a low gear for starting, a direct drive giving 93 miles an hour at an engine speed of 2000 r.p.m., and an indirect geared up drive giving 125 miles an hour at the same engine speed. Special four-ply Rapson tires of 980 by 170 mm. have been built for this car and are mounted on aluminum alloy wheels with vane type spokes.

Despite its dimensions, Bugatti demonstrated the ability of this car to negotiate city traffic at the peak hours and to travel from 2 to 90 miles an hour on high. Gas consumption is stated to be at the rate of 17 miles to the American gallon, this having been obtained the first time the car was put on the road, without special preparation.

This big Bugatti embodies numerous technical innovations. The cylinder block, which measures 55 in. overall, is an iron casting with the crankshaft bearings carried direct in it and an aluminum water jacket and base chamber built around it. Lubrication is of the dry sump type, with two scavenger and one feed pump drawing from a 4-gallon oil tank under the cowl. Suspension is by semi-elliptics at the front, while at the rear there are quarter elliptic springs behind the axle and supplementary quarter elliptics ahead of the axle for extra load.

P.O. Will Sell All Air Mail Equipment

WASHINGTON, Oct. 23—The first step toward relinquishment by the Government of the transcontinental and overnight New York-Chicago air mail services will be taken by the Post Office Department with the issuance, within the next 30 days, of advertisements for bids from private contractors to take over the services. The bids are to be made returnable within 60 days of the publication of the advertisements, Postmaster General New has announced.

In his announcement, the Postmaster General declares that no company "can successfully operate a commercial air service on a mail contract alone, but must also be prepared to transport passengers and express." He states that his Department never planned to continue operation of the air mail service as a permanent feature, but "merely to develop it to a point where its feasibility and practicability could be adequately demonstrated, and then, as soon as commercial flying companies became strong enough to handle such an enterprise, to turn over the fruits of the department's pioneering."

The Post Office Department now has on hand about 85 airplanes, 15 hangars located at various points across the country and considerable shop equipment, worth in all several millions of dollars. All this will be disposed of when private contracts are let.

Rules Patents Improvable

WASHINGTON, Oct. 22—Manufacturers of automobile carburetors run no risk of infringements in improving their mechanism for the thinning out of gas by air. Such is the gist of a lengthy decision just rendered by the United States District Court at New York in sustaining a claim of the Stromberg Motor Device Co., and reported to the Department of Justice. The court held that there is no reason why obsolete patents should not be improved from time to time by the patentees.

Coming Feature Issues of Chilton Class Journal Publications

Nov. 4—Motor World Wholesale. Annual Marketing Issue

Dec. 10—Operation and Maintenance—Service Station Equipment Issue

Dec. 15—Commercial Car Journal—Good Roads Issue

Jan. 1—Automobile Trade Journal. Annual Show Issue

Jan. 6—Motor Age. Annual Show Issue

Jan. 15—Commercial Car Journal—New York Show Issue

Jan. 27—Motor Age—Chicago Show Issue.

Utilities Commissioners to Discuss Regulations

ASHEVILLE, N. C., Oct. 22—Interstate regulation of motor bus and truck operations will be one of the major subjects under discussion at the thirty-eighth annual convention of the National Association of Railroad and Utilities Commissioners, meeting here on Nov. 9 to 12.

"In view of the importance and nation-wide interest in this subject, the Executive Committee has assigned to it the whole morning session of the third day of the convention, the session to be presided over by Hon. Clyde H. Jones, of Indiana, Chairman of the Committee on Motor Vehicle Regulations," says the official call of the meeting sent out to all members.

Plan Battery Plant in K.C.

KANSAS CITY, Oct. 25—Announcement was made this week through the industrial department of the Chamber of Commerce here that the Western Battery & Supply Co. of Denver, will have a new battery plant in operation in Kansas City by Jan. 1.

Parking and Roads Decide Car Future

BUFFALO Oct. 23—The automobile industry has not developed at the expense of other industrial lines, declared L. E. Corcoran, general sales manager of the Pierce-Arrow Motor Car Co., addressing the Greater Buffalo Advertising Club this week. Mr. Corcoran pointed out that most other industries have shown expansion coincidental with the growth of the manufacture and sale of motor vehicles. He declared the automobile industry has not bred extravagance or created false standards of living, as has been stated.

Mr. Corcoran said two factors which, in his judgment, will figure prominently in the future expansion of the automotive business. One was the further improvement of roads and the other the attitude of cities toward the industry. He said there are 495,000 miles of improved highways as against 2,500,000 miles of unimproved roads in the United States, and said motor vehicles will multiply largely in the proportion improved highways are created for them to run on.

"Just as every man has an undeniable right to drive a motor vehicle on the public highways, he has a right to park it on the same highways. It becomes the duty of every citizen to see that the government of his city provides adequate parking facilities."

Engineers Visit Timken

CANTON, Oct. 22—Forty-three members of the Akron section of the American Institute of Electrical Engineers visited the plants here of the Timken Roller Bearing Co. Several hours were devoted to an inspection trip through the various departments. The bearing plant, where more than 160,000,000 bearings have been made, also was visited. At the conclusion of the trip the experimental laboratory was shown. The group came to Canton on a new interurban parlor car, equipped with Timken bearings.

Calendar of Coming Events

SHOWS

BrusselsDec. 4-15
Buenos AiresDec. 7-20
Ninth Argentine Automobile Show,
Palermo Park.
CairoFeb. 15-March 15
First International Motor Show.
ChicagoNov. 8-13
Coliseum, Automotive Equipment
Association.
ChicagoNov. 8-13
Accessory Exhibit, Armory.
ChicagoNov. 15-19
Hotel Sherman, National Standard
Parts Association.
ChicagoJan. 10-15
Coliseum, American Road Builders'
Association.
ChicagoJan. 29-Feb. 5
National, Coliseum, National Auto-
mobile Chamber of Commerce.
ChicagoJan. 29-Feb. 5
Annual Salon, Hotel Drake.

LondonOct. 21-30
Los AngelesFeb. 12-19
Annual Salon, Hotel Biltmore.
New YorkNov. 28-Dec. 4
Annual Salon, Hotel Commodore.
New YorkJan. 8-15
National, Grand Central Palace,
National Automobile Chamber of
Commerce.
ParisDec. 3-19
International Aeronautic Exposi-
tion, Grand Palais.
Ponce, Porto RicoDec. 1-12

CONVENTIONS

American Road Builders' Association,
Congress Hotel, Chicago.....Jan. 10-15
American Welding Society, Broadway
Auditorium, BuffaloNov. 17-19
Associated Manufacturers of Fabric
Auto Equipment, Inc., La Salle
Hotel, ChicagoNov. 13

Automotive Accessories Association,
ChicagoNov. 8-13
Automotive Lighting Association, Drake
Hotel, ChicagoNov. 4
Automotive Equipment Association,
Coliseum, ChicagoNov. 8-13
National Association of Finance
Companies, Palmer House,
ChicagoNov. 15-18
National Automobile Dealers Associa-
tion, La Salle Hotel, Chicago..Feb. 1-3
National Standard Parts Association,
Hotel Sherman, Chicago....Nov. 15-19
National Tire Dealers Association, Inc.,
Memphis, Tenn.Nov. 16-18
Society of Automotive Engineers, Na-
tional Transportation and Service,
BostonNov. 16-18

RACES

Dallas, TexasNov. 11
Los AngelesNov. 25